

Construction and Path Optimization of an Educational Management System that Embeds Employment Guidance into Career Planning

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ABSTRACT Current university employment guidance systems often suffer from vague career planning goals, fragmented curricula, insufficient teaching staff, and weak alignment between academic education and employment needs. This paper proposes embedding employment guidance into a career planning education management system and achieving wholeprocess collaborative education through system analysis and path optimization. The proposed approach includes establishing a four-stage curriculum model of “cognition-experience-decision-development,” building a dynamic assessment method for individual differences using the Career Decision Self-Efficacy Scale, designing modular curricula covering basic cognition, career exploration, vocational skills, and employment guidance, and relying on a schoolenterprise collaborative platform and career development file system for process data tracking and management. The results show that the overall CDSE score increases from 3.42 before reform to 4.23, representing an improvement of 23.6%. Job satisfaction rises from 3.67 to 4.34, an increase of 18.2%. The study verifies that a career planning-oriented employment guidance system can improve students’ career adaptability, employment quality, and education management efficiency.

INDEX TERMS career planning, employment guidance, educational management, path optimization, career decision self-efficacy

I. INTRODUCTION

A. RESEARCH BACKGROUND AND PROBLEMS

UNIVERSITY career guidance, as an important guide for students’ career development, suffers from structural defects that fail to address the highly specialized technical standards and shifting labor demands of the industry. These systemic gaps hinder the alignment between academic preparation and the interdisciplinary expertise required for modern engineering and high-end garment design. Course content is fragmented, there is a lack of cooperation between departments, and guidance often contradicts students’ majors. Management departments prioritize results over students’ career awareness and decision-making, leading to arbitrary career choices [1,2]. Career guidance teachers lack scientific evaluation in curriculum design and guidance, and activities are monotonous with low student participation. Career planning education is widely accepted but largely remains at the theoretical level, lacking effective integration with the career guidance system. It lacks dynamic identification and continuous guidance for individual differences, resulting in students’ incomplete understanding of future career paths, difficulty in forming clear and feasible career goals, low utilization of educational resources, and low

employment quality and satisfaction.

B. RESEARCH SIGNIFICANCE AND INNOVATION

This paper integrates career planning education into the employment guidance process within the education management system, constructing a sustainable collaborative mechanism that replaces linear emergency services with developmental guidance tailored to the dynamic technical and managerial needs of the industry. By shifting toward this proactive model, the study establishes a specialized pathway for cultivating interdisciplinary talents and enhancing their long-term professional adaptability. This is mainly reflected in the restructuring of management and teaching :

- (1) By establishing a continuous tracking and feedback chain through an embedded management model, career development data can be quantified and tracked.
- (2) Establish multi-dimensional course modules and evaluation indicators to make career planning a management component that runs through the entire process of university learning and career preparation;
- (3) Strengthen student self-assessment by using information technology and promote the transformation of the employment guidance system from experience-based to data-

driven.

C. CURRENT STATUS AND GAPS IN DOMESTIC AND INTERNATIONAL RESEARCH

International research primarily focuses on career development theories and individual growth paths. Super's life cycle model and Holland's career interest type theory can serve as theoretical references for vocational education in higher education institutions. International literature lacks research on the institutional embedding of educational management, focusing more on individual psychology or counseling strategies. Domestic research mainly involves reforms in employment guidance courses and the development of counseling services, including course content design, teacher training models, and policy guarantees, but lacks a long-term support approach for the educational management system. Practical research introducing career education concepts often takes the form of single interventions or curriculum innovations, lacking an approach linked to organizational management mechanisms [3,4].

Existing research findings are insufficient to support universities in forming a full-cycle career planning management framework, which is precisely the direction this research aims to break through.

II. THEORETICAL FOUNDATION AND RESEARCH FRAMEWORK

A. CORE THEORETICAL MODEL

This study, based on career development theory, organically combines Super's career life cycle theory and Holland's career personality type theory. Super's theory emphasizes the unity of career choice and self, arguing that human development is a continuous process of self-affirmation and repositioning, and that the construction of educational management systems should adapt to this psychological trend. Holland's theory, starting from interest matching, describes the relationship between career choice and environment through the iaSEC type, providing a structured basis for curriculum modules and guidance methods. Based on these two theories, a career growth path suitable for college students was designed, including self-awareness, environmental exploration, and goal setting. To achieve effective evaluation, Career Making Self-Efficacy (CDSE) theory was introduced, quantifying the decision-maker's confidence level as a measure of the effectiveness of educational intervention.

B. A LOGICAL FRAMEWORK FOR INTEGRATING EMPLOYMENT GUIDANCE AND CAREER PLANNING

This study establishes a continuous model of "cognition-experience-decision-development" to integrate career development goals into university employment guidance and management. Cognition focuses on students' own abilities and career perspectives, achieved through curriculum teaching and psychological assessment. Experience helps students

understand the professional environment through university-enterprise projects and practical activities. Decision-making utilizes a dynamic feedback mechanism, with the management system automatically recording students' career inclinations, development levels, and evaluation results. Development is guided by students' career paths, from educational guidance to career implementation [5,6]. Educational management departments use information support systems to monitor students' career data in a timely manner, forming a traceable growth chain, thereby achieving a rational allocation of educational resources. This integrated approach changes the previous single-course-driven situation, with career education and employment services playing a combined role.

C. RESEARCH HYPOTHESES

To verify the feasibility and effectiveness of the architecture, the study proposes two hypotheses :

H1: When career planning education is integrated into the employment guidance system, students' career decision-making self-efficacy will increase significantly, which is reflected in increased scores in all aspects of CDSE, such as goal setting, planning, and problem-solving abilities.

H2: After the education system is optimized, the employment results will be positive, and the job satisfaction and job matching rate will also increase.

Hypothesis verification should be conducted using a combination of quantitative statistics and comparative analysis. Based on multi-school sample data, the differences before and after the intervention should be tested for significance to determine the model's adaptability and room for improvement, thus providing a basis for management system reform.

III. RESEARCH METHODS AND SYSTEM CONSTRUCTION PATH

A. RESEARCH APPROACH AND PROCESS

This study aims to optimize the structure of the university employment guidance system, and involves literature review, model building, and empirical verification. The literature review primarily collects relevant domestic and international literature on the integration of career planning education and employment guidance management, and extracts structural units and indicators. Model building proposes career planning theory and occupational self-efficacy theory, and establishes a system model based on these. Empirical verification involves collecting data through questionnaires and system surveys, comparing the differences in indicators before and after the reform measures [7,8]. Process data serves as a connection between each stage, realizing the logical transformation from theory to practice and allowing for retrospective analysis of system redesign.

B. BUILD PATH

The education and management system that integrates employment guidance with career planning unfolds in three dimensions: system, curriculum, and practice.

The design system includes student development goals, teaching content and evaluation standards. Goals are set according to different disciplines, with career cognition, skills development and career planning as the main indicators. Multiple evaluations are achieved based on multi-source data, including student self-evaluation, observation of students and vertical integration of employer feedback data. Dynamic evaluation uses the measurement process of career decision self-efficacy scales such as CDSE. Weekly evaluation generates students' career development curves, automatically records the changes in each person's score, and provides guidance to management departments. Universities enter the scale results into students' career files to form a continuous monitoring network, providing a basis for guiding personalized training programs [9].

The curriculum is modularized, divided into four aspects: basic cognition, career exploration, skills enhancement, and employment guidance. Teachers participate in the collaborative design of the curriculum, combining theoretical education with simulated practice, case analysis, job experience, and strategy training to improve students' decision-making abilities [10,11]. The curriculum has a chain-like structure, allowing students to receive guidance at different learning stages. School-enterprise collaboration is achieved through data sharing via a platform, with enterprise mentors and school teachers jointly participating in student development evaluation. The platform collects information such as internship status, job requirements, and career adjustments, guiding education management departments to analyze the quality of vocational training. Student career development files are archived digitally to facilitate subsequent employment recommendations and competency analysis.

C. DATA COLLECTION AND SAMPLE DESCRIPTION

Data was collected from 618 undergraduate students across five universities in eastern, central, and western China. The sample comprised students from STEM, management, and humanities majors, ensuring strong representativeness. The questionnaire was based on the Career Decision-Making Self-Efficacy Scale, with 42 additional indicators for employment satisfaction and job fit. Semi-structured interviews were conducted with faculty advisors and industry mentors to obtain operational feedback and evaluations of the system's operation. Employment statistics were analyzed using the university-level information management platform, comparing the data from students before and after the system's implementation. Data were validated using SPSS and AMOS for significance and structural modeling. This study was approved by the Ethics Committee of Zhengzhou Shengda University of Economics, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

Table 1 shows the sample distribution and the structure of the main data sources, which is used to illustrate the rationality of the composition of the research sample and the extensibility of the data collection methods.

The data were compared across samples and over time to obtain multi-level coverage and statistical reliability. These data were then used for modeling and analysis to examine the impact of the system construction on CDSE scores and employment quality.

To reduce sample selection bias and ensure the industry applicability of the research results, this study prioritized the similarity of the professional structures and the coverage of applied disciplines when selecting five universities. Although the industry backgrounds and regional economic environments of the five universities differ, each university has science and engineering professional groups related to design, and their career education systems and university-industry cooperation mechanisms are comparable.

IV. EMPIRICAL ANALYSIS AND RESULTS

A. DATA ANALYSIS METHODS

SPSS 26.0 and AMOS 24.0 software were used for statistical analysis and structural equation modeling (SEM) validation to examine changes in students' career decision self-efficacy (CDSE) and employment quality indicators before and after the system was constructed. Data analysis included descriptive statistics, paired samples t-tests, and path analysis. The CDSE scale consisted of four parts: self-assessment, goals, plans, and problems, with 5-7 items and a five-point scale. KMO and Bartlett's methods were used to test the data applicability; the reliability coefficient Cronbach's α was 0.91, indicating reliable internal consistency of the questionnaire. The AMOS path analysis model examined the impact path of the system improvement on career self-efficacy and employment satisfaction. The fit index confirmed the model structure was reasonable, reflecting the continuity and significant effect of the educational intervention, and this was used as the basis for the results judgment.

To ensure the scientific rigor of the data comparison, this study clarified the time and conditions for the "before reform" and "after reform" samples: the pre-reform data was taken from the survey results of graduating students in the academic year prior to the implementation of the system (2021–2022 academic year), while the post-reform data was taken from similar graduating classes one year after the system's implementation (2022–2023 academic year). Both groups of samples came from the same university and the same major group, with consistent teaching staff and curriculum structure; the only difference was whether or not career planning education and an information-based employment guidance system were integrated.

B. RESULTS DISPLAY

Table 2 shows that after universities incorporated career planning into employment guidance management, students' self-decision-making ability in career decisions significantly improved. The average CDE score increased from 3.42 to 4.23, a 23.6% increase. Job satisfaction increased from 3.67 to 4.34, an 18.2% increase; the accurate employment rate

TABLE 1. Sample Distribution and Main Data Sources

Data categories	Sample size (people/item)	Percentage (%)	Data source	illustrate
Science and engineering students	248	40.1	School-level questionnaire system	Covering engineering, materials, computer science and other majors
Management students	176	28.5	Survey Questionnaires and Interview Records	Includes Business Administration and Human Resource Management majors
liberal arts students	194	31.4	Questionnaires and Employment Statistics Database	Including education, psychology and language-related majors
Teacher Interview Samples	35	—	semi-structured interview	Covering career guidance teachers and class tutors
Corporate Mentor Sample	twenty two	—	Enterprise cooperation platform	Companies come from the manufacturing and service industries
total	618 students, 57 mentors	100	Multi-source data integration	A unified database is formed for model analysis.

reached 92.4%, a 15.8 percentage point increase compared to before the reform. The sub-item results indicate that goal setting and plan execution have the greatest impact, and the optimization of the system improved structured decision-making ability and execution confidence. Table 2 lists the experimental comparison results of the main indicators, covering multidimensional data on self-efficacy and outcome performance.

Data results indicate that the system embedding and information-based management approach have positively impacted students' clarity in career planning, with all four dimensions of CDSE (Career, Employment, and Study) showing an increase and a stable growth trend. Students' career confidence, job matching awareness, and actual employment outcomes have all shown considerable improvement.

C. DISCUSSION AND VERIFICATION

Multi-level comparisons of data before and after the reform verified the effectiveness of the education management system construction. Structural equation modeling showed that the standard path coefficient of improved career planning teaching on occupational self-efficacy was 0.73, and the indirect effect coefficient on employment satisfaction was 0.56. Self-concept construction at the cognitive level influenced employment outcomes through behavioral improvements. Table 3 shows the changes and verification of key indicators after the optimization of the education management system.

Teacher interviews revealed that the guidance provided after the system's implementation became more targeted, and students were more proactive in career exploration, goal selection, and job preparation. Industry-university collaboration made vocational education feedback more authentic, with industry mentors providing better evaluations of student communication and job adaptability than before. The results support hypotheses H1 and H2, demonstrating that a well-developed system can improve career self-efficacy and employment quality. This also validates the sustainability of the integrated educational management system.

V. SUGGESTIONS FOR SYSTEM OPTIMIZATION AND IMPLICATIONS FOR EDUCATIONAL MANAGEMENT

A. OPTIMIZATION STRATEGY

Research results indicate that the integrated system of career planning and employment guidance has good structural

adaptability, but its sustainable operation and stability need improvement. Universities should implement tiered career education, dividing it into three stages: enrollment guidance, professional exploration, and career development. Different training objectives and standards should be proposed based on the characteristics of each grade and major, allowing students to receive corresponding development guidance at different learning stages. Establishing a full-process tracking mechanism is crucial for maintaining the system's effectiveness and stability. Through an information-based career file management system, the entire process of career awareness, course feedback, and employment outcomes can be recorded. Data can be accessed and analyzed in a timely manner to guide individual development and policy changes. Teacher training mechanisms should shift from knowledge transmission to professional consultation and data analysis support. Universities should establish career guidance teacher development programs to provide full-time and part-time teachers with training in career counseling skills, psychological counseling, and the use of assessment tools. The establishment of a university-enterprise collaboration mechanism can further strengthen the practice-oriented approach. Through enterprise mentorship systems, job experience projects, and crossdepartmental joint assessments, a closed loop from classroom learning to job matching can be formed. Real-world career scenario data from enterprise participation can support course feedback, and continuous interaction can make education dynamically adaptable and realistically oriented, ensuring that employment guidance truly becomes a process of career development rather than a result-oriented service.

B. IMPLICATIONS FOR EDUCATIONAL MANAGEMENT

The integration and feedback of educational data will be a crucial aspect of improving university career guidance systems. Universities should integrate career planning and career guidance into their management design, avoiding information silos and repetitive needs between departments. Educational administrators can leverage data-driven models to build dynamic monitoring systems, tracking changes in students' career self-efficacy and adjusting course content and guidance measures based on data analysis. Digitalizing teaching management processes can create a refined decision-making mechanism, making student development visible and allowing management departments to assess the effectiveness of educational interventions based on real data.

TABLE 2. Comparative Analysis of Student Employment and Career Performance Indicators Before and After Reform

Indicator Dimensions	average before reform	Post-reform mean	Increase (%)	Sample size	Significance (p)
Career decision-making self-efficacy (CDSE total score)	3.42	4.23	23.6	618	<0.001
Goal setting dimensions	3.31	4.18	26.3	618	<0.001
Plan execution dimension	3.37	4.27	26.7	618	<0.001
Problem-solving dimensions	3.45	4.06	17.7	618	0.002
Job satisfaction	3.67	4.34	18.2	618	<0.001
Accurate employment rate (proportion of highly matched jobs)	76.6%	92.4%	+15.8	618	—

TABLE 3. Changes and Verification of Key Indicators After Optimization of the Education Management System

Indicator Categories	Measurement content	Improvement instructions	Data support sources
Occupational self-efficacy	Students' confidence level regarding career goals and decision-making abilities	The results showed a significant improvement, with a path coefficient of 0.73.	Structural Equation Modeling (AMOS) Analysis Results
Job satisfaction	Graduates' subjective evaluation of job suitability and career development opportunities	It shows an upward trend, with an indirect effect coefficient of 0.56.	Questionnaire statistics
Student participation rate	Participation rate in guidance activities and feedback sessions	An increase of approximately 21% compared to before the reform.	Teacher Interviews and Platform Records
Enterprise Evaluation	Employers' rating of students' overall qualities and job suitability	The overall score has increased by approximately 12% compared to the previous period.	Corporate Mentor Feedback

From an educational decision-making perspective, the operation of the career guidance system should not be viewed as an assessment result but rather as an integral part of a student growth support system. Accumulated career data can provide quantitative references for enrollment plans, major adjustments, and university-industry cooperation, contributing to the optimization of the university's structure. Integrating student development data into the education quality evaluation system in a systematic way shifts the management logic from administrative to development-driven. This highlights the significant importance of improving university education management systems.

VI. CONCLUSION

This research proposes a system construction approach oriented towards developmental guidance by integrating career planning education into the specific educational management process, thereby aligning the structural improvement of university employment systems with the evolving technical and professional standards of the industry. By embedding industrial trends into the entire guidance framework, this study establishes a specialized mechanism for cultivating high-quality talents capable of meeting the demands of modern garment and fiber sectors. Through a combination of theory and practice, it demonstrates that this system helps cultivate students' career decision-making abilities and promotes the efficient use of educational resources. In the system's operation, career planning is no longer an independent course but becomes part of teaching, management, and evaluation, realizing a transformation from educational content to a governance model. Data-driven tracking and dynamic evaluation effectively support the construction of students' career growth paths. The management process is continuously optimized through information feedback, thereby improving universities' employment preparation, updating educational concepts, and embedding career development education into the entire talent cultivation process. These practical results provide a scalable model for universities to build an integrated, data-driven employment system tailored to the high-tech demands of the industry,

offering a theoretical basis for reforming higher education management to better align with modern professional standards. By grounding the system in industrial data and career trajectories, this research establishes a robust path for cultivating specialized talents capable of driving innovation in the global fiber and garment sectors.

AUTHOR CONTRIBUTIONS

Li Luo designed, collected and analyzed the data, and drafted the manuscript. Li Luo conducted the study, critically revised the manuscript for important intellectual content, and gave final approval of the version to be published. Li Luo participated fully in the work, take public responsibility for appropriate portions of the content, and agreed to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

CONFLICTS OF INTEREST

The author declares no conflict of interest.

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HUMAN RESEARCH SUBJECTS

This study was approved by the Ethics Committee of Zhengzhou Shengda University of Economics, and was performed in accordance with the principles of the Declaration of Helsinki. All eligible participants signed an informed consent form.

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