FACTORS ANALYSIS OF CAREER EDUCATION IN APPLIED UNDERGRADUATE COLLEGES: A CASE STUDY OF SOUTHWEST JIAOTONG UNIVERSITY HOPE COLLEGE*

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Abstract

Against the backdrop of China's higher education transformation toward applied talent cultivation and global digital education reform, empirical research on career education in private applied undergraduate colleges remains insufficient. This study takes Southwest Jiaotong University Hope College, a representative applied undergraduate institution, as the research case to explore the key factors influencing the effectiveness of career education, and construct a scientific evaluation framework for career education in such institutions. This research adopts a mixed-methods design. A total of 717 valid questionnaires are collected from undergraduate students, and semi-structured interviews are conducted with career education teachers and students. Grounded in the CIPP evaluation model and Social Cognitive Career Theory, the study uses SPSS and AMOS for statistical analysis, and extracts core influencing factors through exploratory factor analysis.

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The findings show that students hold a generally positive evaluation of the college's career education, while there are still challenges including unbalanced allocation of practical resources, insufficient professional competence of career guidance teachers, and low status of career education in the institutional evaluation system. Student participation and teacher guidance have significant positive impacts on students' career development capabilities. Four core influencing factors are identified: career development effectiveness, teaching interaction and course quality, student background characteristics, and practical experience.

Keywords: Factors analysis, Career Education, Applied Undergraduate Colleges

Introduction

Driven by the new round of scientific and technological revolution and industrial transformation, digital technology has become a core driving force reshaping global educational development. Educational digital transformation was identified as a priority action area at the United Nations Transforming Education Summit, and China has also promoted in-depth reform of digital education through the 2023 World Digital Education Conference, laying a policy foundation for the innovation of career education in higher education (Ministry of Education of the People's Republic of China, 2024).

Meanwhile, China's higher education system is undergoing a profound transformation from a traditional research-oriented model to an application-oriented approach, aiming to align talent cultivation with regional economic and industrial needs (Pan & Shi, 2023). The central government has issued a series of policies to support this transformation, emphasizing industry-education integration, university-enterprise collaboration, and the cultivation of students' practical and professional competencies (State Council, 2019). However, the transformation still faces challenges such as unclear institutional positioning,

insufficient practical ability of faculty, and imperfect evaluation system for career education effectiveness (Wu, 2021).

Southwest Jiaotong University Hope College, a Sino-enterprise cooperative full-time undergraduate institution established in 2009, is one of the first pilot universities for applied transformation reform in Sichuan Province. With rail transit as its flagship discipline and civil engineering as its foundational discipline, the college has built more than 200 university-enterprise cooperative practice bases, and maintained a graduate employment rate of over 96% for seven consecutive years (China Academy of Educational Sciences, 2024). Existing domestic research on career education mostly focuses on comprehensive universities and vocational colleges, with insufficient systematic empirical analysis on private applied undergraduate institutions. Therefore, exploring the key influencing factors of career education effectiveness in this college is of great practical significance for optimizing its career education system and providing reference for similar institutions.

Objectives

1) To identify the key factors affecting the effectiveness of career education in private applied undergraduate colleges, with Southwest Jiaotong University Hope College as a typical case.

2) To construct a scientific and operable effectiveness evaluation framework for career education in private applied undergraduate institutions, and verify the influence mechanism of each factor on students' career development competencies.

3) To put forward targeted and replicable optimization suggestions for improving career education in Southwest Jiaotong University Hope College and similar applied undergraduate institutions.

Literature Review

1. Theoretical Foundations

This study is grounded in four interrelated theoretical frameworks, which collectively form the analytical basis for the evaluation of career education effectiveness.

First, the CIPP evaluation model proposed by Stufflebeam provides a systematic structure for assessment from four dimensions: context, input, process and product, breaking through the limitation of traditional result-oriented evaluation and supporting comprehensive examination of the career education system (Stufflebeam & Shinkfield, 2007). Second, Social Cognitive Career Theory (SCCT) emphasizes the dynamic interaction among self-efficacy, outcome expectations, personal goals and environmental factors in shaping career development trajectories, which explains how student engagement and external support affect educational outcomes (Lent et al., 1994). Third, Super's Career Development Theory points out that college students are in the career exploration stage, and targeted interventions are needed to foster their self-awareness and occupational exploration ability (Super, 1990). Fourth, the Applied Talent Training Theory highlights the core position of competence and practice, advocating school-enterprise cooperation and project-based learning to improve students' vocational capabilities (Pan, 2021).

Based on the above theories, this study constructs a conceptual framework, which takes student engagement, teacher guidance professionalism, scientificity of educational content, school-enterprise cooperation practice platform and support service system as input variables, takes career development competencies of students as outcome variables, and extracts core influencing factors through exploratory factor analysis, so as to put forward targeted optimization suggestions.

2. Research Progress on Career Education Effectiveness

Career education research in developed countries such as the United States, the United Kingdom and Germany has formed a mature system. In terms of practice, universities generally set up specialized career centers to provide career assessment, mock interview and industry connection services, and use digital platforms to realize personalized and data-driven guidance (NACE, 2023). In terms of evaluation, career education is integrated into the institutional quality assurance system, with dual attention to formative and summative assessment, and indicators such as employment rate, job fit and student satisfaction are adopted for comprehensive measurement (Watts & Sultana, 2021).

In China, career education has developed rapidly with the support of macro policies. The Ministry of Education has clearly required the integration of full-process career education into the four-year undergraduate training system, and local regions have also launched corresponding pilot projects (Ministry of Education of the People's Republic of China, 2024). Domestic research mainly focuses on curriculum models aligned with student development stages, key influencing factors such as student engagement and teacher professionalism, and localized evaluation frameworks (Liu & Feng, 2020). Existing studies have confirmed that practical platforms, school-enterprise cooperation and institutional support services are important conditions for improving the effectiveness of career education (Rauner & Maclean, 2021). However, there are still limitations such as insufficient localization of foreign theories and lack of targeted research on private applied undergraduate institutions (Zhang, 2024).

3. Research Gaps and This Study's Innovations

Existing research on career education in China mostly takes comprehensive universities or vocational colleges as research objects, and lacks systematic empirical evaluation on private applied undergraduate colleges that are in the critical period of transformation. In terms of evaluation methods, most studies rely on satisfaction surveys and administrative data, and lack multi-

dimensional analysis combining process variables and outcome variables (Zhang, 2023).

This study makes up for the above gaps through three innovations. First, it takes Southwest Jiaotong University Hope College, a representative private applied undergraduate institution, as the case, to carry out targeted research in line with the characteristics of application-oriented talent cultivation. Second, it integrates four theoretical frameworks to construct a localized multi-dimensional evaluation model, covering structural, process and outcome dimensions of career education. Third, it adopts a mixed-methods design combining quantitative survey and qualitative interview to improve the scientific rigor of the evaluation, and provide empirical evidence for the optimization of career education in similar institutions.

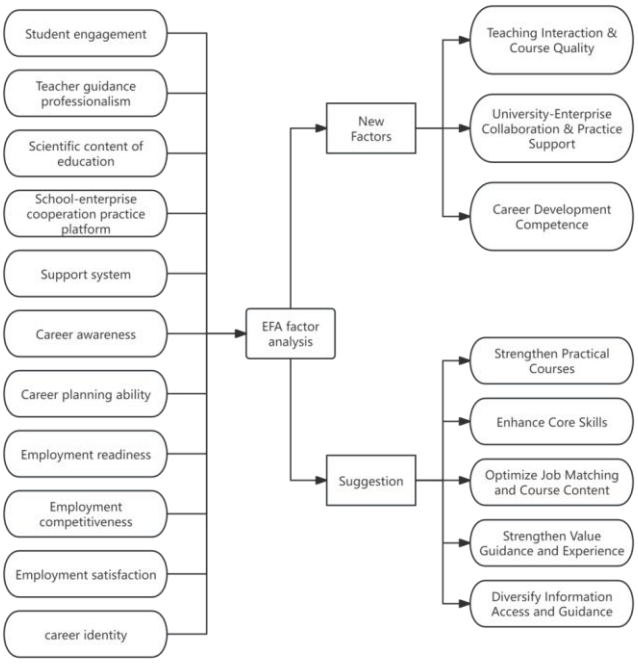


Figure 1. Conceptual framework

Methodology

This study adopts a mixed-methods research design combining quantitative and qualitative approaches, to systematically explore the key factors influencing career education effectiveness in applied undergraduate colleges.

Research Population and Sampling

The target population includes 27,000 undergraduate students and 80 career education teachers at Southwest Jiaotong University Hope College. For the questionnaire survey, stratified random sampling was adopted based on the Krejcie & Morgan table, with stratification by grade and major category. A total of 717 valid questionnaires were collected after screening, covering students from 2021 to 2024 cohorts across different majors. For the qualitative part, 10 career development teachers were selected through purposive sampling for semi-structured interviews, supplemented by interviews with current students and employment guidance personnel, to obtain multi-perspective insights.

Research Instruments

The questionnaire was designed based on research hypotheses and variable structures, adopting a five-point Likert scale (1 = strongly disagree, 5 = strongly agree). It covers five independent variable dimensions (student engagement, teacher guidance professionalism, scientificity of educational content, school-enterprise cooperation practice platform, educational support service system) and five dependent variable dimensions (career awareness, career planning ability, employment readiness, employment competitiveness, employment satisfaction). The reliability and validity of the scale were tested through Cronbach's α coefficient, expert review and exploratory factor analysis.

The semi-structured interview outline focuses on four core themes: overall evaluation of career education programs, most helpful courses and activities, existing shortcomings and improvement suggestions, and the roles of teachers, enterprises and institutions in career guidance.

Data Collection and Analysis

Questionnaire data were collected through the Questionnaire Star electronic platform, distributed via class groups and counselor promotions. Invalid questionnaires with inconsistent logic or excessively short completion time were excluded in the preprocessing stage. Interviews were conducted in mid-April 2025 through offline meetings and online video calls. All interviews were recorded and transcribed into text for analysis with the informed consent of the interviewees.

For quantitative data, SPSS and AMOS software were used for statistical analysis, including reliability and validity test, exploratory factor analysis, correlation analysis, regression analysis and analysis of variance (ANOVA). For qualitative interview data, thematic analysis was adopted following the six-step method proposed by Braun and Clarke (2006), to sort out core viewpoints and typical problems.

Research Ethics

All data collected in this study are only used for academic research. The questionnaire adopts anonymous collection, and the interview content is desensitized in the analysis process, to strictly protect the personal privacy of respondents.

Results

Sample Characteristics

The questionnaire sample has a relatively balanced gender distribution, with 55.93% male students and 44.07% female students. It covers all undergraduate grades, among which the 2024 cohort accounts for the highest proportion (44.35%). In terms of discipline distribution, engineering students account for 83.12%, which is consistent with the engineering-oriented positioning of the college. In terms of practical experience, 41.42% of students have

internship or practical experience, while 58.58% have not, indicating that a considerable proportion of students lack systematic practical training. The specific demographic information is shown in Table 1.

Table 1. Basic Information of Questionnaire Survey Samples

Demographic Variable	Category	Subtotal	Percentage
Gender	Male	401	55.93%
	Female	316	44.07%
Grade	2021 Cohort	16	2.23%
	2022 Cohort	180	25.10%
	2023 Cohort	203	28.31%
	2024 Cohort	318	44.35%
Discipline of Major	Engineering	596	83.12%
	Business	71	9.90%
	Liberal Arts	31	4.32%
	Others	19	2.65%
Internship/Practical Experience	Yes	297	41.42%
	No	420	58.58%

Descriptive Statistical Analysis

The descriptive statistical results of main research variables show that the mean values of all dimensions exceed the midpoint value 3 of the scale, indicating that students have a generally positive evaluation of career education. Among them, teacher guidance professionalism has the highest mean value (M = 3.77, SD = 1.16), followed by the scientificity and practicality of course content (M = 3.70, SD = 1.18) and student engagement (M = 3.69, SD = 1.20). The school-enterprise cooperation and practice platform has the lowest mean value (M = 3.52, SD = 1.26) with a large standard deviation, reflecting the uneven distribution of practical resources among student groups. The specific results are shown in Table 2.

Table 2. Descriptive Statistical Analysis of Main Research Variables

Variable Dimension	Number of Items	Mean	Standard Deviation (SD)
Career Education Participation	4	3.69	1.20
Professionalism of Teacher Guidance	4	3.77	1.16
Scientificity and Practicality of Course Content	4	3.70	1.18
School-Enterprise Cooperation and Practice Platform	4	3.52	1.26
Evaluation of Support Service System	4	3.61	1.20
Career Development Effectiveness	8	3.55	1.20

Reliability and Validity Test

The reliability analysis results show that the overall Cronbach's α coefficient of the 32-item scale is 0.982, and the composite reliability (CR) is 0.983, indicating excellent internal consistency. The Cronbach's α coefficients of each dimension range from 0.817 to 0.921, and the CR values range from 0.823 to 0.925, all exceeding 0.8, confirming good reliability of each dimension. The specific results are shown in Table 3.

Table 3. Results of Scale Reliability Analysis

Variable Dimension	Number of Items	Cronbach's α Coefficient	Composite Reliability (CR)
Student Participation	4	0.896	0.902
Professionalism of Teacher Guidance	4	0.913	0.918
Scientificity of Educational Content	4	0.905	0.911
School-Enterprise Cooperation Practice Platform	4	0.921	0.925
Educational Support Service System	4	0.887	0.893
Career Cognition	2	0.824	0.830
Career Planning Ability	2	0.841	0.847
Employment Preparation	2	0.853	0.859

Variable Dimension	Number of Items	Cronbach's α Coefficient	Composite Reliability (CR)
Employment Competitiveness	2	0.836	0.842
Employment Satisfaction	2	0.817	0.823
Overall Scale	32	0.982	0.983

The validity test shows that the KMO value is 0.981, and Bartlett's test of sphericity is significant (χ^2 = 30978.376, df = 496, $p < 0.001$), confirming that the data is suitable for factor analysis. After rotation, exploratory factor analysis extracts four common factors, which explain 78.61% of the total variance. The factor loading of each item is above 0.40 without obvious cross-loading, indicating good convergent and discriminant validity. The specific factor eigenvalues and variance explanation rate are shown in Table 4.

Table 4. Factor Eigenvalues and Cumulative Variance Explained Rate (After Rotation)

Item	Factor 1	Factor 2	Factor 3	Factor 4
Eigenvalue (After Rotation)	12.12	10.51	1.29	1.23
Variance Explained % (After Rotation)	37.86%	32.85%	4.04%	3.86%
Cumulative Variance Explained % (After Rotation)	37.86%	70.71%	74.75%	78.61%

According to the connotation of items, the four extracted factors are named as follows: Factor 1 is Career Development Effectiveness, reflecting students' career cognition, planning ability and employment preparation; Factor 2 is Teaching Interaction and Course Quality, covering teaching participation, teacher guidance and course quality; Factor 3 is Student Background Characteristics, reflecting individual differences of students; Factor 4 is Practical Experience, focusing on internship and practical participation.

Correlation and Regression Analysis

Correlation analysis shows that there are significant positive correlations between career education participation and all career development indicators ($p < 0.01$), with correlation coefficients ranging from 0.61 to 0.83. Specifically, student engagement is strongly correlated with career awareness ($r = 0.66$) and employment readiness ($r = 0.61$); teacher guidance professionalism is highly correlated with career planning ability ($r = 0.71$) and employment competitiveness ($r = 0.71$).

Regression analysis confirms that career education participation has a significant positive predictive effect on career development indicators ($p < 0.05$ or $p < 0.01$). The adjusted R^2 of the regression model for career development effectiveness is 0.595 ($F = 263.845$, $p = 0.000$). Among them, "participating in vocational guidance activities" ($\beta = 0.32$) and "taking the initiative to obtain career information" ($\beta = 0.21$) have the highest regression coefficients, indicating that active practical participation is critical for promoting students' career development.

ANOVA Results

The ANOVA results show that there are significant differences in career development indicators among students with different participation levels (F values range from 314.217 to 395.562, $p < 0.001$). The effectiveness of career development increases progressively with the increase of participation level.

Students at the highest participation level (score 5) have a mean value of 4.72–4.81, which is significantly higher than that of students at the lowest level (score 1, mean 1.29–1.43).

Qualitative Interview Results

Thematic analysis of interviews identifies three key themes. First, the professional level of career guidance teachers needs to be improved, as most teachers lack systematic career counseling training and carry out guidance based on personal experience. Second, career education is marginalized in the evaluation system, with low weight in teacher performance appraisal and insufficient incentive mechanisms. Third, although practice platforms are highly recognized, resources are unevenly distributed among different majors and grades, resulting in gaps in practical opportunities for students.

Discussion

Interpretation of Core Findings

The results of this study show that students have a generally positive evaluation of career education in Southwest Jiaotong University Hope College, which is consistent with the college's remarkable achievements in applied talent cultivation. The four core factors extracted through exploratory factor analysis cover the outcome, process, individual input and practical support dimensions of career education, which verifies the applicability of the CIPP evaluation model and Social Cognitive Career Theory in the context of private applied undergraduate colleges in China.

The significant positive correlation between student participation and career development capabilities confirms that active engagement in career education activities is a key driver for improving students' career awareness and planning ability, which is consistent with the research conclusions of Whiston et al. (2021). The important role of teacher guidance professionalism also reflects

that the quality of guidance personnel directly affects the effectiveness of career education, which echoes the research viewpoint of Gysbers & Keene (2021).

The three problems identified through interviews and descriptive statistics—unbalanced practical resources, insufficient teacher professionalism and marginalized evaluation status—are common challenges faced by private applied undergraduate colleges in the transformation process. The low score and large standard deviation of the school-enterprise cooperation dimension indicate that the allocation of practical resources is affected by factors such as major characteristics and grade stage, which leads to unequal access to practical opportunities for students.

Theoretical and Practical Implications

Theoretically, this study constructs a multi-dimensional evaluation framework for career education effectiveness suitable for private applied undergraduate institutions, which enriches the localized research on career education in the context of application-oriented transformation. By integrating four classical theories and verifying the influence mechanism of each factor through empirical data, this study supplements the empirical evidence for the application of relevant theories in Chinese higher education scenarios.

Practically, the findings of this study can directly guide the optimization of career education in Southwest Jiaotong University Hope College. The identified key factors and existing bottlenecks provide a clear direction for the college to allocate educational resources and reform the curriculum system. Meanwhile, the evaluation framework and improvement strategies proposed in this study have strong replicability, and can provide reference for other applied undergraduate colleges undergoing transformation.

Limitations of the Study

This study has four main limitations. First, the sample is only from Southwest Jiaotong University Hope College, which limits the generalizability of the conclusions to other regions or types of institutions. Second, data collection

is concentrated in one semester, which cannot realize long-term tracking of the effectiveness of career education. Third, the questionnaire results rely on students' self-evaluation, which may be affected by cognitive level, emotional state and social expectation, leading to potential subjective bias. Fourth, restricted by data dimensions, the evaluation index system has limited explanatory power for some latent variables, which needs to be further revised in future research.

Recommendation

Based on the comprehensive analysis of quantitative and qualitative results, combined with relevant theoretical frameworks, this study puts forward the following targeted recommendations to improve the effectiveness of career education in Southwest Jiaotong University Hope College and similar applied undergraduate institutions.

First, improve the professionalism of career guidance teachers. Institutions should establish a systematic training and development mechanism, organize regular specialized training in cooperation with academic institutions and industry associations, and cover career counseling theories, practical guidance skills and industry development trends. Teachers should be encouraged to obtain professional certifications in career education, and industry internship opportunities should be provided to build a "dual-qualified" faculty team. A mentorship system should also be established, where experienced career counselors guide new teachers, and dedicated time and resources should be allocated for teachers to carry out career education research and teaching innovation.

Second, optimize the career education curriculum system. The curriculum should be dynamically updated to match industrial demands and technological progress, and integrate more real cases, project-based learning and

industry standards. A progressive curriculum structure should be adopted for different grades: freshmen focus on career cognition and self-assessment, sophomores and juniors carry out professional skill development and industry exploration, and seniors receive targeted employment guidance and entrepreneurship training. The digital transformation of the curriculum should be promoted, such as expanding the "Cloud Career Guidance" platform to include virtual simulation internships, online career assessments and micro-credential courses. Enterprise mentors should be introduced into more core teaching modules to bridge the gap between classroom learning and workplace practice.

Third, deepen school-enterprise cooperation and balance practical resources. Institutions should actively expand partnerships with enterprises in key industries, especially those matching flagship disciplines such as rail transit and civil engineering, and establish long-term and stable internship and training bases. Practical training programs should be co-designed with enterprises to ensure that students can gain hands-on experience related to their career goals. A unified management system for practical opportunities should be established to ensure equitable access for different majors and grades. Financial support and policy incentives such as tax reductions or honorary recognition should be provided for cooperative enterprises to enhance their enthusiasm for participation.

Fourth, upgrade the career education support service system. The functions of the Career Guidance Center should be expanded to provide one-on-one career counseling, psychological support and personalized development plans, to meet the diverse needs of students. The "four-level linkage mechanism" for employment docking should be optimized to strengthen information sharing among schools, departments, classes and enterprises, and improve the accuracy of job recommendation. Comprehensive guidance services should be provided for students with further education or international development needs. Off-campus activities such as enterprise visits, career lectures and academic

competitions should be regularly organized to enrich students' practical experience and industry insights.

Fifth, improve the evaluation and incentive mechanism. Career education should be incorporated into the institutional quality assurance system and teachers' performance appraisal, with clear assessment indicators covering teaching quality, student feedback and guidance effectiveness. Incentive policies such as awards for excellent career education courses or research achievements should be set up to stimulate teachers' enthusiasm for teaching innovation. A multi-dimensional evaluation system for career education effectiveness should be adopted, integrating process indicators and outcome indicators to realize developmental evaluation. Value guidance should be strengthened to create a positive atmosphere for career education, and students should be encouraged to participate in career-related clubs and social practices, so as to cultivate their initiative and practical abilities.

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