Region-Educational Research and Reviews, 2025,Volume 7, Issue 6
DOI:10.12238/rerr.v7i6.4177
ISSN Online:2661-4634
ISSN Print:2661-4626

Research on the Construction of Comprehensive Quality Evaluation System for College Students under the Background of "Five Education" Integration

Xinnan Li*, Cuiping Zhang

Department of General Education, Liaoning University of International Business and Economics, Dalian, Liaoning, 116000, China

Abstract: Under the background of "Five Education" integration, this paper constructs a comprehensive quality evaluation system for college students that integrates moral education, intellectual education, physical education, aesthetic education, and labor education. Based on the comprehensive development concept, combined with machine learning algorithms to dynamically adjust the evaluation dimension weight, a multi-modal data tracking multi-evaluation mechanism is designed. The methodology system combined with theory and practice constructed in this study realizes the monitoring of the whole process of student development through education digital transformation, which not only improves the theoretical framework of higher education evaluation, but also provides an operable implementation plan for improving the quality of talent training, and effectively promotes the implementation of the fundamental task of "Lide and Treat People".

Keywords: Five education, Comprehensive quality evaluation of college students, Analytic Hierarchy Process, Machine Learning

1. Introduction

1.1 Research Background and Current Situation

In today's society, with the deepening of economic globalization and the rapid development of science and technology, the demand for talents is showing a trend of diversification and integration. The comprehensive quality evaluation of college students is an important part of the talent training system in colleges and universities, and its research background is closely related to multiple factors such as higher education reform, changes in social talent needs, and students' individual development demands. The 2020 "Overall Plan for Deepening the Reform of Education Evaluation in the New Era" clearly states that "reform student evaluation to promote the all-round development of morality, intelligence, physical, aesthetic and labor; innovate the process evaluation method of morality, intelligence, physical, aesthetic and labor, and improve the comprehensive quality evaluation system " [1], emphasizing that by building and improving the comprehensive quality evaluation system for the all-round development of morality, intelligence, physical, aesthetic and labor, in order to cultivate more high-quality talents with innovative spirit, practical ability and social responsibility.

There are still many shortcomings in the current evaluation system of college students' comprehensive quality. In terms of evaluation indicators, there is a phenomenon that pays too much attention to intellectual education achievements

and ignores moral education, physical education, aesthetic education and labor education. Aiming at the existing problems, domestic scholars have carried out in-depth discussions on the evaluation of students' comprehensive quality [2-4]. Therefore, under the background of "Five Education" integration, it is of great practical significance to build a scientific and reasonable comprehensive quality evaluation system for college students.

1.2 Research purpose and significance

The purpose of this paper is to construct the comprehensive quality evaluation system of college students based on the background of "Five Education", in order to evaluate the comprehensive quality of college students comprehensively, objectively and accurately, and provide strong support for the training of college talents and the reform of education and teaching.

For applied undergraduate universities, the implementation of comprehensive quality evaluation is a key path to deepen the integration of production and education and optimize the talent training model. The evaluation system breaks through the single score orientation, and promotes the coordinated development of students' practical ability, innovative spirit and professional quality by introducing enterprise participation and industry standards, and promotes the accurate docking of talent supply and industrial demand. The evaluation system constructed in this paper will help universities cultivate comprehensive talents that meet social needs and provide strong talent support for social development.

2. Construction of Comprehensive Quality Evaluation Index System for College Students

In order to comprehensively improve the quality of talent training in applied undergraduate colleges and universities, it is crucial to build a quality assurance system guided by "developmental evaluation". The system takes "promoting effective learning for each student" as the core goal, and builds a dynamic monitoring and feedback mechanism covering the whole process of teaching. It not only ensures that students' professional ability and comprehensive quality meet standards, but also stimulates teaching vitality through continuous improvement, and forms an education ecosystem guided by the growth process and focusing on the value-added ability, so as to achieve a deep adaptation between the quality of talent training and industrial needs. Based on the comprehensive development view and developmental evaluation theory, this study divides the comprehensive quality evaluation of college students into five dimensions (see Table 1).

Tier 1 indicator (weight)	Tier 2 indicator (weight)	Evaluation focus
moral education(30%)	Ideological and political literacy (12%)	Political theory study, social responsibility awareness (party activities, volunteer service, etc.)
	Moral character (10%)	Integrity record, teamwork, school compliance
	Professional values (8%)	Professional ethics awareness and professional attitude in corporate practice
Intellectual education(25%)	Academic performance (8%)	Professional course grade point, core course compliance rate
	Practical ability (12%)	Achievements of production-education integration projects, enterprise practice evaluation, and awards in skills competitions
	Innovation ability (5%)	Patents, innovation and entrepreneurship projects, technical reports
Physical education (15%)	Physical health (7%)	Body test compliance rate, BMI index
	Exercise habits (5%)	Daily exercise duration, participation in

Tier 1 indicator (weight)	Tier 2 indicator (weight)	Evaluation focus
		physical education classes
	Competitive spirit (3%)	Participation in internal and external sports competitions and teamwork performance
Aesthetic Education (15%)	Artistic accomplishment (6%)	Art course grades, participation in art activities (exhibitions, concerts, etc.)
	Aesthetic ability (5%)	Design work quality, artistic creation achievements
	Cultural heritage (4%)	Traditional cultural practices, cross-cultural communication
Labor Education (15%)	Labor practice (7%)	On-campus labor curriculum performance, enterprise production practice labor attitude
	Volunteering (5%)	Community service hours and participation in public welfare projects
	Professional quality (3%)	Tool operation proficiency (e.g. engineering equipment), labor safety awareness

Table 1: The comprehensive quality evaluation index system of college students

Based on Analytic Hierarchy Process (AHP) and expert advice, the initial weights for five aspects of the comprehensive quality evaluation of applied undergraduate university students are determined to be 30%, 25%, 15%, 15%, and 15% respectively. The initial weights are only "a priori assumptions", and then the machine learning framework (such as random forest, logistic regression, etc.) is applied to realize the dynamic adjustment and optimization of the weights through actual data training. The weights are used as trainable parameters to construct the optimization objective function, and the weights are updated by layer descent method and other methods.

This method of "prior guidance + data calibration" combined to determine weights can not only reflect the scientific nature of the initial weights (that is, based on expert consensus), but also highlight the adaptive nature of dynamic adjustment (that is, data-driven optimization), providing a complete logical chain for the weight design of the evaluation system.

3 Evaluation Method and Implementation Process

3.1 Evaluation Method

This study combines three evaluation models: quantitative, qualitative, and comprehensive: accurate measurement is implemented through a quantifiable index system, and multi-modal evidence chains such as classroom performance, project results, and growth archives are collected through the production-education integration platform to form a quality development radar map; on this basis, an innovative "target framework + data-driven" dual-drive evaluation model is designed, and machine learning algorithms are used to dynamically calibrate and aggregate quantitative benchmarks and qualitative characteristics, and finally generate a personalized ability index and transform it into teaching improvement strategies to realize the closed-loop transformation of evaluation results to teaching quality improvement.

3.2 Implementation Process

The implementation process of this evaluation system is divided into four steps: first, formulate the scoring rules, clarify the scoring standards and scoring methods for each indicator; collect students' daily performance data; according to the scoring rules, quantify each evaluation index and obtain comprehensive evaluation results through weighted calculation; feed back the evaluation results to students in a timely manner, and promote their reflection, improvement and comprehensive development through targeted guidance.

4. Conclusion and Future Work

This paper constructs the framework of "Five Education" collaborative education, which forms an organic whole with

moral education casting soul, intellectual education strengthening foundation, physical fitness, aesthetic education moisturizing heart, and hard education. Through machine learning algorithms to dynamically calibrate the weight of the Five Education indicators, the evaluation data can be realized Multimodal collection and intelligent analysis. In the future, it is necessary to establish a dynamic adjustment mechanism driven by social demand, deepen the application of AI technology in process evaluation, expand the dimensions of new indicators such as digital literacy and cross-border ability, and build an evaluation ecology of production and education linkage. The optimization of the evaluation system needs to rely on multi-party coordination mechanism, improve the adaptability of talent supply and industrial demand through continuous iteration, and provide a practical paradigm that can be popularized for the digital transformation of higher education.

Acknowledgements

This is the phased research achievement of the 2024 Basic Scientific Research Project of Liaoning Provincial Department of Education, titled Research on the Value-Added Evaluation of College Students' Comprehensive Quality Based on Analytic Hierarchy Process (Project No.: LJ132410841013).

References

[1] The Central Committee of the Communist Party of China and the State Council issued the "Overall Plan for Deepening Education Evaluation Reform in the New Era". Ministry of Education of the People's Republic o f China

[2] Zhao Qi. Construction of the Comprehensive Quality Evaluation System of College Students Based on A HP. Journal of University of Shanghai for Science and Technology, 2023,45(1).

[3]Wang Xin, Han Jieping, Ding Tao. Research on the Comprehensive Quality Evalution System for College Students in the New Era. Journal of Jilin Institute of Chemical Technology, 2024, 41(4).

[4] Li Yong, Tang Xiaoqing, Lei Yuanyuan, Hu Likun. Construction and Practice of Comprehensive Quality Evaluation Model of University Students under Education Evaluation Reform in the New Era. Journal of Higher Education, 2024.