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Research on the Evaluation of the Implementation Effect and Policy Optimisation of Comprehensive Reform Policies in Higher Education

Yiye Zhang [1, a], Yifan Huang [2, b], Haoyu Fan [2,c,*], Xiaoxi Cao [2, d]

[1] College of Economics, Nankai University, Tianjin, 300071, China

[2] College of Economics and Management, Civil Aviation University of China, Tianjin, 300300, China

[a] zhang_yy@cauc.edu.cn , [b] 1602598759@qq.com, [c] txzz0511@163.com, [d] txzz0711@163.com

Abstract: With the ongoing deepening of China's comprehensive higher education reform, the development of higher education is undergoing great changes. This study analyses the current state of higher education in China from multiple dimensions. It organises and examines the comprehensive reform policies and measures implemented in higher education across China. An evaluation index system is established, consisting of student cultivation quality, educational quality, faculty quality, and educational environment—to assess the effectiveness of the comprehensive reform policies in the eastern regions. Finally, based on the findings, this study explores and summarises the experience and new pathways of comprehensive reform in universities, offering insights for the continued reform of higher education.

Keywords: Higher education; Comprehensive reform; Governance system; Fuzzy comprehensive evaluation

1. Introduction

The new technological revolution and industrial transformation are reshaping the form, mode, and pattern of various industries in China. It has put forward new concepts, goals, and requirements for higher education regarding disciplinary and professional settings, talent cultivation, and scientific research. China's higher education is facing four major transformation pressures, consisting of economic globalization, social informatization, cultural diversity, educational modernization (Zhou & Wang, 2020). Higher education undertakes the historical task of cultivating advanced professional talents, improving scientific and technological levels, serving social and economic development, and promoting cultural inheritance and innovation. Universities in China balance talent cultivation, scientific advancement, economic impact, and cultural preservation through mission-weighted evaluations, which were adopted in China's 2020 reforms (Li & Chen, 2019). Therefore, it needs to build a high-quality educational system and focus on cultivating new generations who can take on the great task of national rejuvenation.

The comprehensive reform of higher education, as a practical approach to achieve high-quality development, is supported by relevant policies. After over 60 years of tortuous development, China's higher education has achieved tremendous results and entered the popularisation stage. With the rapid development of the international economy, the transformation of social information, cultural diversity, and the modernisation of education, China's higher education reform and development face new opportunities and challenges. Such as disparities in digital infrastructure between elite and regional universities and faculty reluctance to adopt AI/online tools due to traditional teaching norms (Liu & Li, 2022; MOE Research Group, 2023). Centralized policies struggle with local implementation and scarcity of bilingual/globally trained academics in STEM fields. Due to the influence of historical legacy factors and constraints on economic and social development, the development of higher education in different regions reveals unevenness among other regions. Analysis of MOE funding statistics revealed that eastern universities received 68% of national R&D resources, while policy analysis showed Belt and Road Initiative (BRI) partnerships disproportionately favoured coastal institutions, highlighting systemic regional imbalances (Yang &

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Xie, 2021). Therefore, it is urgent to conduct in-depth research on the implementation effects of comprehensive reform policies in higher education.

The research on higher education reform mainly focuses on textual analysis of reform policy measures and practical exploration. Regarding textual analysis of reform policy measures, the study mainly focuses on the connotation, mode, and path of comprehensive higher education reform. A study of Learning Analytics (LA) in 20 UK universities investigated ethical concerns by combining Foucault's disciplinary power with data justice theory. Through policy critique and interviews with 48 teachers, the research revealed that LA's "risk algorithms" (e.g., attendance predictors) often stigmatized disadvantaged students, with only 15% of teachers fully understanding data collection scopes due to black-box issues (Williamson et al., 2022). China's Double First-Class initiative exemplified a hybrid approach, balancing state mandates with selective marketization (Yang & McCowan, 2021). A meta-analysis of 1,200 studies found that industry collaboration boosted research impact but often led to publication delays. The study advised universities to establish IP fast-tracks for critical projects (Perkmann et al., 2022). Regarding the comprehensive reform model of higher education, the main focus is on the research of the comprehensive reform of graduate education in universities, which can be summarised as element-based, process-based, and subject-based reform models. A study proposed creating Interdisciplinary Coordinator roles to improve cross-disciplinary collaboration (Holley, 2022). The development of university-industry partnerships was traced through three phases: 1.0 (1980s linear tech transfer), 2.0 (2000s innovation ecosystems), and 3.0 (2020s Quadruple Helix emphasizing social value), with China's Tsinghua x-lab serving as a notable case where aging-solutions projects actively engaged communities (Etzkowitz & Zhou, 2021). Meanwhile, path exploration suggestions for the comprehensive reform of higher education have also been analysed in constructing "double first-class" universities (Liang, 2019).

Previous studies have analysed the path of comprehensive reform in higher education from multiple perspectives, including teacher team building, talent cultivation, curriculum construction and pedagogy reform, and changes in the higher education ecosystem, providing a reference approach for implementing comprehensive reform in higher education (Hu, 2019). A mixed-methods study combining policy analysis with case studies of three elite universities in China, including 34% of graduates lacking essential digital skills (Zhou & Wang, 2020). Analysis of regional GDP-university funding correlations alongside qualitative interviews exposed structural biases in China's higher education policy, and the study advocated for equity-focused resource reallocation to address regional disparities (Yang & McCowan, 2021).

As for connotation of comprehensive reform in higher education mainly focuses on the current global trend of the higher education system and institutional reform and makes necessary suggestions for its connotation (Zhang, 2019).

As for practical exploration, scholars analyse specific cases and policy measures in advanced regions, the importance of e-learning in higher education reform, and "classroom learning". Research in China generally focus on the reform experience of various provinces or specific ordinary universities as examples to conduct research, such as exploring the comprehensive education reform in Guangdong Province, Beijing Technology and Business University, Baotou Vocational and Technical College and other specific cases (Liu, 2019).

Most current research focuses on basic theories, macro-strategic levels, or specific policies. Qualitative research methods are the dominant approach, mainly focusing on preliminary exploration of models, typical practices, and professional discussions related to comprehensive education reform. There is a lack of research on the implementation effects of comprehensive higher education reform policies. Therefore, this study conducts a comprehensive review of the development of higher education policies in different regions of China. After comparing the policy texts, an evaluation system for the implementation effect of the comprehensive reform of higher education policies was established from four dimensions: student cultivation quality, educational quality, faculty quality, and educational environment. The entropy weight and fuzzy comprehensive

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evaluation methods were used to evaluate the implementation effect of the comprehensive reform of higher education policies in the eastern region of China. From a macro perspective, the factors that affect the actual impact of the comprehensive reform of higher education were analysed comprehensively, expanding the research scope and enriching the development of higher education. The comprehensive reform-related theories provide a new basis for the comprehensive reform of higher education and have important theoretical significance.

2. Analysis of the Current Situation of Comprehensive Reform Policies in Higher Education in China

The comprehensive policies and regulations on higher education from 2016 to 2022 reveal an upward trend, especially with a significant increase between 2020 and 2022 (see Figure 1 for details). In terms of content, more emphasis is placed on reforming innovative courses in universities and practical talent cultivation programs and models. Efforts are strengthened to review academic papers and enhance the capabilities of the teaching staff. The Ministry of Education has issued a decree throughout the process. Additionally, the number of documents issued is higher than that of other departments. With the deepening of comprehensive reform of higher education, the Ministry of Education pays more attention to the synergy and quality of higher education reform. It does not rely solely on external quantitative indicators. Moreover, the related policies focus on in-depth practical investigation and research and put forward higher quality and standard requirements for higher education reform.

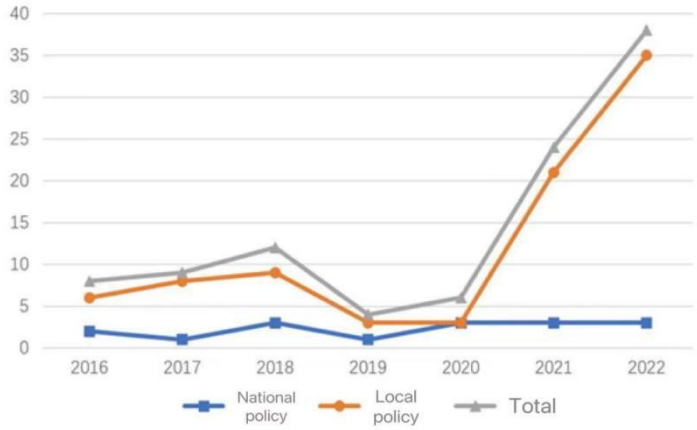

Figure 1 Quantity of Comprehensive Policies and Regulations in Higher Education (2016-2022)

In 2019, the central government issued the "China Education Modernisation 2035," which proposed eight basic concepts for promoting education modernisation. These concepts require universities to continuously encourage reform and innovation in education and teaching management, cultivate first-class talents, and provide direction for the future development of comprehensive reform of higher education.

Subsequently, the continuously issued policies such as "Several Opinions on Promoting Discipline Integration and Accelerating Graduate Cultivation of Artificial Intelligence in the Construction of Double First-Class Universities," "14th Five-Year Plan for Employment Promotion," and other relevant reform regulations on higher education proposed to cultivate compound talents from multiple aspects, strengthen industry education integration, and build a community of independent innovation and talent cultivation.

Under the promulgation of the national policy system on comprehensive reform of higher education, various regions in the eastern part of China have issued implementation measures for comprehensive reform of higher education based on their development situation to promote the implementation of the strategy of building a strong country with higher education talents and cultivate advanced high-quality talents in the new era. For example, in 2020 and 2021, Beijing

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issued notices on “Several Measures to Support Employment and Entrepreneurship of College Graduates in Beijing” and “Several Opinions on Coordinating the Reform and Development of Higher Education in Beijing,” which increased the construction of student cultivation effects based on current reforms and vigorously promoted innovation, entrepreneurship, and employment services. In addition to the capital city, other eastern provinces and cities have formulated relevant policies and measures to cultivate talents that may help local social and economic development. From 2017 to 2019, Tianjin issued nine policies related to comprehensive education reform. During the 14th Five-Year Plan period, new standards have been emphasised on cultivating innovative and entrepreneurial talents, curriculum reform, and integrating industry and education in Tianjin. At the same time, Jiangsu Province and Zhejiang Province have continuously made efforts. Based on their situation, these two provinces have increased investment in science and technology innovation and research to promote the transformation of scientific and technological achievements. Meanwhile, clear requirements are put forward for the quality construction of teaching ability, which can lead to cultivating students’ innovative practical skills and improving their application of knowledge abilities. As for the situation in central and western regions of China, although limited by their economic situation, they have stepped up their efforts to seize opportunities, promoted their own higher education construction, and improved the comprehensive reform of higher education. However, the faculty quality still varies greatly, and the scale and quality of teaching are difficult to improve rapidly in a short period.

In light of the above, the comprehensive reform policies of higher education in the eastern region of China have issued a large number, with a long period and comprehensive content. They are in a leading position in China. The requirements for comprehensive reform are not limited to external quantitative indicators but have also increased qualitative inspections, focusing on high-quality requirements for student cultivation effectiveness and educational quality. Various provinces and cities in the eastern region continue to make efforts, providing a model for the comprehensive reform of higher education. The frequency of issuing policies related to comprehensive higher education reform in the central and western regions is lower than in the eastern regions, and the content is not comprehensive enough. Therefore, evaluating the effectiveness of the comprehensive reform policies for higher education in the eastern region of China can provide reference and experience for the central and western regions and promote the development of higher education in China.

3. Evaluation of the Implementation Effect of Comprehensive Reform Policies for Higher Education in the Eastern Region

3.1 Construction of Evaluation Index System for the Implementation Effect of Comprehensive Reform Policies in Higher Education

The comprehensive reform of higher education is carried out to adapt to the rapidly developing economy, society, and the social demand for talent. Universities transitioned from mass-scale education to 'talent customization,' yet systemic rigidity persists despite demand-driven reforms (Wang & Li, 2022). Therefore, establishing an evaluation index system for the implementation effect of comprehensive reform policies in higher education can be based on four aspects to evaluate the effectiveness of policy implementation: student cultivation quality, educational quality, faculty quality, and educational environment. The construction of the indicator system must follow several basic principles such as systematicity, objectivity, operability, effectiveness, and comparability. The construction of the indicator system is as follows.

(1) Student cultivation quality

Student cultivation quality is an important way to reflect the implementation of comprehensive reform in higher education intuitively. Student outcomes are the ultimate litmus test of reform not just employment numbers, but their capacity to drive national innovation (2023 Report on China’s Education Modernization). The focus and prominent effects of comprehensive reform in higher

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education are reflected in student cultivation quality, including the employment rate, master's acceptance rate, and the number of students who gained awards in the top 300 national academic competitions.

(2) Educational quality

The educational quality mainly involves the investment and education of resources, teaching level, and students' abilities in the reform process of universities. Strategic resource allocation and teaching quality improvements synergistically enhance student competencies, with empirical evidence showing resource inputs account for 58% of observed variance in graduate employability metrics (Li & Wang, 2020). There is a non-linear critical point in the impact of resource investment on education quality (United Nations Educational, 2018). It is an important manifestation of deeply implementing the spirit of higher education reform and innovation, accelerating the establishment and improvement of the education review system, and promoting the comprehensive development of higher education. Therefore, the indicator of educational quality can be evaluated using indicators such as higher education investment, number of graduate students, number of "double first-class" schools, graduates' satisfaction, and number of patents.

(3) Faculty quality

The implementation effect of the comprehensive reform policy of higher education can be reflected to a certain extent through the faculty quality, which is necessary for implementing and carrying out the reform policy of higher education. Faculty quality mediates policy effectiveness in China's reforms, stressing human-centric development as the core driver of sustainable institutional change (Chen & Liu ,2023). It emphasises people-oriented and the integrated development of faculty is a comprehensive, internal, and continuous process, which is a prominent manifestation of the comprehensive reform process of higher education. The faculty quality includes the number of Ph.D. teachers, the number of associate professors and above, the number of national-level projects, and the number of scientific and technological papers.

(4) Educational environment

The quality of the educational environment has become an important indicator for measuring the implementation effect of comprehensive reform policies in higher education. The institutional environmental quality of higher education is a key predictive indicator of the effectiveness of higher education reform. Its explanatory power surpasses traditional factors, and cross-continental experiments have proven that this conclusion has cultural universality (Schmidt & Zhang, 2021). The resource environment dimension significantly outperforms the cultural environment dimension (Li, 2022). High-quality educational outcomes cannot be achieved without a high-quality academic environment. Therefore, the educational environment can be evaluated using indicators such as sports field area, library literature amount, simulation experiment software, number of digital terminals, network multimedia classroom teaching, and scientific research equipment assets.

Therefore, this study establishes an evaluation index system for the implementation effect of comprehensive reform policies in higher education, including four first-level indicators (student cultivation quality, educational quality, faculty quality, educational environment) and 20 second-level indicators (as shown in Table 1).

Table 1 Evaluation Index System for the Implementation Effect of Comprehensive Reform Policies in Higher Education

First-level indicators	Second-level indicators
Student cultivation quality(A1)	Employment rate (A11)
	Enrolment rate (A12)
	Top 300 national subject competitions (A13)
Educational quality (A2)	Higher education investment (A21)
	Number of graduate students (A22)
	Number of "double first-class" schools (A23)
	Graduate satisfaction (A24)

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	Patent quantity (A25)
	Number of master's programs (A26)
	Number of doctoral programs (A27)
Faculty quality (A3)	Number of doctoral teachers (A31)
	Number of associate senior and above (A32)
	Number of national-level project entries (A33)
	Number of scientific and technological papers (A34)
Educational Environment (A4)	Sports field area (A41)
	Books (volumes) (A42)
	Simulation experiment software (A43)
	Number of digital terminals (A44)
	Network multimedia classroom (A45)
	Teaching and research instrument and equipment assets (A46)

3.2 Analysis of the implementation effect of comprehensive reform policies in higher education

3.2.1 Data sources

This study collected data from 2016 to 2020 by searching and gathering the official websites of the Ministry of Education, China Statistical Yearbook, and China Education Statistical Yearbook, as well as the related government official websites, statistical bureaus, and intellectual property bureaus of seven provinces and three cities in the eastern region of China.

3.2.2 Methodology

This study uses the grey relational analysis method to quantitatively analyse the implementation effect of the comprehensive reform policy of higher education in the eastern region. Grey correlation analysis is a data processing method that quantitatively analyses the main relationships and overall evolutionary trends between various factors. The main advantage of grey correlation analysis is that it does not require too much data volume and can better process data systems with strong practicality. Validate grey relational analysis as a practical, small-sample-friendly tool through mathematical proofs and comparative case studies in education systems. (Liu & Forrest ,2019). The specific methods are as follows.

The first step is to develop a reference sequence.

If the reference sequence is $x_0=\{x_0(1),x_0(2),\cdots,x_0(n)\}$ and the compared sequence is $x_i=\{x_i(1),x_i(2),\cdots,x_i(n)\}$, then the difference between the points on the curves of the two sequences can be expressed as the formula:

$$\delta_i(k)=\frac{\min\limits_i \min\limits_k |x_0(k)-x_i(k)|+\rho \max\limits_i \max\limits_k |x_0(k)-x_i(k)|}{|x_0(k)-x_i(k)|+\rho \max\limits_i \max\limits_k |x_0(k)-x_i(k)|}$$

Here, $\delta_i(k)$ is referred to as the correlation coefficient of k, and ρ is referred to as the resolution coefficient.

The second step is to determine the optimal set of indicators. Let $F^*=[j_1^*,j_2^*,\cdots,j_n^*]$ be the optimal indicator set, where $j_k^*(k=1,2,\ldots,n)$ is the optimal value for the -th indicator. Then, construct the matrix D based on the optimal value of the nth indicator and the original data.

$$D=\begin{bmatrix} j_1^* & j_2^* & \cdots & j_n^* \\ j_1^1 & j_2^1 & \cdots & j_n^1 \\ \cdots & \cdots & \cdots & \cdots \\ j_1^n & j_2^n & \cdots & j_n^m \end{bmatrix}$$

In the formula, j_k^i is the original value of the k-th indicator in the i-th scheme.

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The third step is to standardise the indicator values. Let the variation interval of the k-th indicator be $[j_{k1},j_{k2}]$, where j_{k1} is the minimum value of the k-th indicator among all schemes, and j_{k2} is the maximum value of the k-th indicator among all schemes. The standardised formula is:

$$C_k^i=\frac{j_k^i-j_{k1}}{j_{k2}-j_{k1}}$$

The fourth step is to calculate the results. The correlation coefficient between the -th indicator and the optimal value of the -th indicator in the -th scheme is given by the formula:

$$\delta_i(k)=\frac{\min\limits_i \min\limits_k \left|c_k^0-c_k^i\right|+\rho \max\limits_i \max\limits_k \left|c_k^*-c_k^i\right|}{\left|c_k^*-c_k^i\right|+\rho \max\limits_i \max\limits_k \left|c_k^*-c_k^i\right|}$$

Finally, the comprehensive evaluation result is obtained, expressed as the formula:

$$r_i=\sum_{k=1}^{n}[W(k)\cdot\delta_1(k)]$$

If r_i is the largest, it can be considered closer to the optimal indicator; the i-th scheme is better than the other schemes. It can be arranged in order. The evaluation index system provides k indicators for this model, which serve as the model's scale in different years. Through the above steps, the advantages and disadvantages of each year are sorted; based on this, the implementation effect of the comprehensive reform policy of higher education in the eastern region from 2016 to 2020 can be reflected.

This study uses the entropy method to determine the weights of indicators. This method assigns weights to indicators based on the data itself, substantially impacting the evaluation of the implementation effect of the eastern region's comprehensive higher education reform policy. The specific method is as follows.

The first step is to dimensionless the data. Since the larger the evaluation indicators in this article are, the better, there is no need for data normalisation. Therefore, the formula is directly used for dimensionless processing:

$$Y_{ij}=x_{ij}\sqrt{\overline{x_j}}$$

Where y_{ij} is the dimensionless value of the j-th indicator in sample i.

Step two uses the formula to calculate the entropy value of the indicator.

$$ej=-K\sum_{i=1}^{m}p_{ij}\,lnp_{ij}\left(0\le e_j\le 1\right)$$

Among them $p_{ij}$is the proportion $p_{ij}=\frac{Y_{ij}}{\sum_{i=1}^{m} ij}$ of the j-th indicator in the sample i; $k=\frac{1}{\ln m}$, m is the sample size.

The third step determines the weight of evaluation indicators. Based on calculating the index difference coefficient $h_j=1-e_j$, it can calculate the weight of the j-th index, expressed as the formula:

$$w_j=\frac{h_j}{\sum_{j=1}^{n}h_j}$$

Therefore, the weights of the evaluation indicators can be calculated (as shown in Table 2).

Table 2 Weight of Evaluation Indicators

First-level indicator	Second-level indicators	Weight
Student cultivation quality (A1)	Employment rate (A11)	0.04501036
	Enrolment rate (A12)	0.04356494
	Top 300 national subject competitions (A13)	0.04387896
Educational quality (A2)	Higher education investment (A21)	0.0450412
	Number of graduate students (A22)	0.04476155

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	Number of “double first-class” schools (A23)	0.04470762
	Graduate satisfaction (A24)	0.09686501
	Number of patents (A25)	0.04355756
	Number of master’s degree programs (A26)	0.0535077
	Number of doctoral programs (A27)	0.04369613
Faculty quality (A3)	Number of doctoral teachers (A31)	0.04355857
	Number of deputy senior and above (A32)	0.04514556
	Number of national-level project entries (A33)	0.0440279
	Number of scientific papers (A34)	0.04515168
Educational environment (A4)	Sports field area (A41)	0.04449557
	Book (volume) (A42)	0.04384743
	Simulation experiment software (A43)	0.04382367
	Number of digital terminals (A44)	0.05008312
	Network multimedia classroom(A45)	0.04389963
	Teaching and research instrument and equipment assets (A46)	0.0443492

Through calculations, it was observed that there were no obvious extreme values in the data of each indicator. Therefore, to facilitate calculations and ensure the authenticity of data processing, assuming that $\rho=1$ in the correlation coefficient formula, the correlation coefficients of each indicator were calculated (as shown in Table 3).

Table 3 Correlation coefficients of evaluation indicators

Second-level indicators	2016	2017	2018	2019	2020
Employment rate (A11)	0.5	0.6	0.6279	0.7500	1
Enrolment rate (A12)	0.5316	0.7451	1	0.5	0.9650
Top 300 national subject competitions (A13)	0.5	0.5790	0.6663	0.8238	1
Higher education investment (A21)	0.5	0.5	0.5	1	1
Number of graduate students (A22)	0.5	0.5751	0.6829	1	0.7525
Number of “double first-class” schools (A23)	0.5	0.5156	0.5653	0.6396	1
Graduate satisfaction (A24)	0.5	1	1	1	1
Number of patents (A25)	0.5	0.6055	0.7029	0.7427	1
Number of master’s degree programs (A26)	0.5	0.5165	0.6183	0.6461	1
Number of doctoral programs (A27)	0.5	0.5	1	1	1
Number of doctoral teachers (A31)	0.5	0.5	1	1	1
Number of deputy senior and above (A32)	0.5	0.5584	0.6509	0.7935	1
Number of national-level project entries (A33)	0.5	0.5593	0.7124	0.7599	1
Number of scientific papers (A34)	0.5	0.5593	0.6615	0.7386	1
Sports field area (A41)	0.5	0.6243	0.7528	0.9283	1
Book (volume) (A42)	0.6863	0.7667	0.8552	0.5	1
Simulation experiment software (A43)	0.5	0.5667	0.6429	0.7754	1
Number of digital terminals (A44)	0.5	0.5698	0.6374	0.7656	1
Network multimedia classroom (A45)	0.5	0.5920	0.7099	0.8167	1

Subsequently, weighted calculations are performed on each indicator for each year to obtain the weighted correlation value of the data. The weighted correlation values of each indicator are summed up annually to get the weighted correlation degree for each year (as shown in Table 4).

Table 4 Weighted correlation degree

Weighted correlation degree	2016	2017	2018	2019	2020
Total	0.4870	0.5930	0.7142	0.7622	0.9423
Student cultivation quality	0.0676	0.0803	0.0953	0.1029	0.1309

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Educational quality	0.1853	0.2433	0.3036	0.3244	0.3595
Faculty quality	0.0894	0.1028	0.1241	0.1439	0.1788
Educational environment	0.1446	0.1664	0.1911	0.1909	0.2730

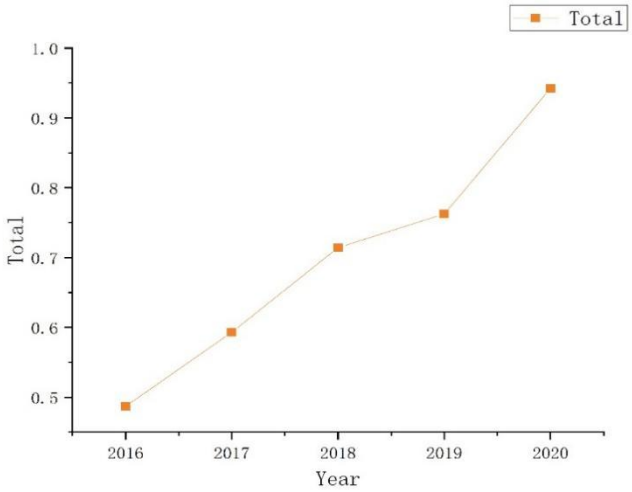

Figure 2 Trends of weighted correlation degree

Table 4 and Figure 2 show that the weighted correlation of the implementation effect of the comprehensive reform policy of higher education in eastern China has substantially improved since 2016, reaching the highest level in 2020. This can indicate that the implementation effectiveness of comprehensive reform policies for higher education in the eastern region of China continues to improve, and the direction and measures of reform are developing positively.

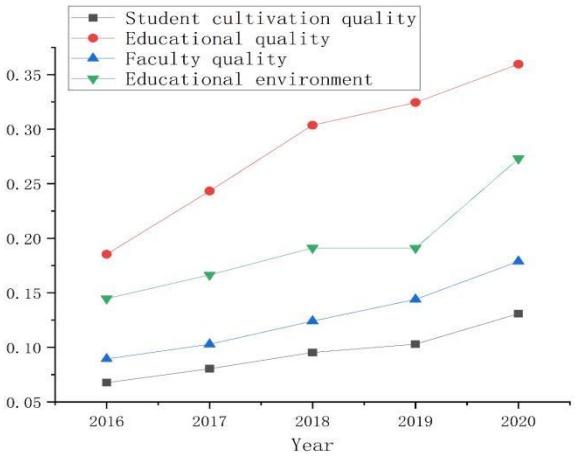

Figure 3 The contribution rates of indicators to the weighted correlation degree

Figures 2 and 3 show that the implementation effect of the comprehensive reform policy of higher education in the eastern region of China has achieved good results from 2016 to 2020. However, the impact and contribution of the four aspects in this implementation process are different. The four indicators of student cultivation quality, educational quality, faculty quality, and educational environment are quantitatively used to demonstrate the policy implementation effect of the comprehensive reform of higher education in the eastern region of China from multiple aspects. The four indicators are interrelated and inseparable, and changes in one indicator will have a certain impact on the other indicators. Subsequent analysis reveals that this is as follows.

(1) Student Cultivation Quality

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The contribution level of student cultivation quality shows a relatively low trend compared to the other three indicators, but still shows a steady growth trend, with a significant increase from 2019 to 2020. This is mainly due to the significant increase in the correlation coefficient between the top 300 national subject competitions and the enrolment rate in 2019–2020, compared to previous years. Due to the strengthened support for the comprehensive reform policy of higher education in the eastern region in 2019, the encouragement of innovation and entrepreneurship among college students, and the favourable external environment, the student cultivation quality has been improved, indicating that the implementation of the comprehensive reform policy of higher education in the eastern region of China has a certain impact on the student cultivation quality.

(2) Educational Quality

The contribution level of the indicator of educational quality is at its highest position, and the upward trend from 2016 to 2020 has also shown the most significant change. It can be seen that the comprehensive reform of higher education has the most significant impact on educational quality. The main reason for this upward trend is the increase in investment indicators in higher education and the rise in the number of "double first-class" schools. The second issuance of the list of "double first-class" universities in China has, to some extent, promoted the progress of universities in the teaching process reform, curriculum construction, and other aspects, as well as improved the quality of their education. In light of the above, the implementation of comprehensive reform policies in higher education substantially impacts the quality of education, and the implementation effect is relatively good.

(3) Faculty Quality

The faculty quality has shown a steady upward trend in implementing the comprehensive reform policy of higher education in the eastern region of China, but the magnitude has not changed considerably. The contribution level of the four indicators is relatively low. From a time range perspective, the increase was significant from 2019 to 2020, mainly due to the significant improvement in the correlation between the number of doctoral teachers and the number of national-level project indicators. The faculty quality also plays a significant role in the quality of education. The improvement of the faculty quality has promoted a significant increase in the quality of education, indicating that implementing the comprehensive reform policy of higher education in the eastern region of China also has a certain impact on improving the faculty quality.

(4) Educational Environment

Compared with the other three indicators, the indicators of educational environment have a relatively large degree of fluctuation but still show a gradually increasing trend, especially in 2019–2020. This shows a significant increase, mainly due to the significant correlation between the indicators of teaching and research instruments and equipment assets and the indicators of sports field area. However, from 2018 to 2019, a downward trend has existed, mainly due to the decline in the indicators of teaching and research instruments and equipment assets. In summary, since the implementation of the comprehensive reform policy for higher education in the eastern region of China, more attention has been paid to the construction and improvement of the educational environment, which has considerably impacted the academic environment. At the same time, it reflects that implementing the comprehensive reform policy for higher education in the eastern region of China considerably impacts the educational environment.

4. Conclusion and Policy Suggestions

This study mainly evaluates the implementation effect of the comprehensive reform policy of higher education in the eastern region of China. Through the analysis of the evaluation index system for the implementation effect of comprehensive reform policies in higher education, the implementation effect reveals a relatively good level. However, at the same time, the fluctuation of each indicator also exposes some problems in the implementation of comprehensive reform policies.

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Therefore, the following suggestions are proposed to optimise the comprehensive reform policy of higher education in China.

4.1 Optimise the Talent Cultivation Approach and Cultivate Innovative Talents for the New Era

Based on the analysis, universities need to reform their spirit in the first place. With improving practical management system and talent cultivation strategy, they can comprehensively improving the quality level of higher education and deeply grasping the concept of professional talent cultivation, forming a new talent cultivation model with multiparty cooperation, and transforming the expansion of higher education scale into the connotation development of improving the quality level of higher education. Based on the characteristics of individual universities and the development situation of local industries, the aim is to cultivate new era composite talents with innovative abilities and a pioneering spirit, which can better meet society's current employment and talent needs.

Universities in the central and western regions with slower development could transform their unique educational advantages into inherent educational potential. Meanwhile, they could increase efforts in building educational spirit, philosophy, teaching objectives, curriculum reform, teaching construction, and innovation capabilities and form unique educational personalities and characteristics.

4.2 Deepen Teaching Reform and Optimise the Quality of Education

In the face of the new situation of economic and social development, if China wants to cultivate practical talents, the top priority is to strengthen curriculum construction, enhance the construction of “double first-class” disciplines, vigorously strengthen the construction of new engineering or new humanities that are in line with the characteristics and advantages of our school, and promote curriculum reform. The operation of a university ultimately boils down to running several disciplines and majors well. Eventually, the specific carrier of discipline and major construction lies in the college. From this perspective, if the university’s active learning and initiative are not high, it will be difficult for the university to establish its characteristics and advantages and build several disciplines and majors with its characteristics and advantages. Therefore, promoting discipline construction and increasing curriculum reform efforts cannot be separated from the support and efforts of the college. Giving more power to the delegated college promotes discipline and professional construction, highlights the university’s characteristics, and accelerates integration with local industries. Additionally, it is essential to comprehensively enhance university teachers’ professional competence and educational ability. Whether it is the construction of new engineering and humanities disciplines or “double first-class” disciplines, excellent teaching guidance is indispensable and closely related to university teachers’ teaching and professional abilities. Therefore, strengthening teachers' abilities in all aspects and improving the professional quality of the teaching faculty are essential for promoting subject construction and curriculum reform.

4.3 Strengthening Innovation leadership and Constructing the School Environment

Higher education reform ultimately aims to cultivate innovative talents suitable to serve society. Therefore, cultivating students’ innovative spirit and enhancing their innovation and entrepreneurship abilities are substantial in promoting the expansion of employment choices and improving employment rates. Universities must strengthen their support for innovation projects, organise diversified innovation and entrepreneurship activities, stimulate students’ initiative, and build innovative and practical courses with their characteristics, providing transition and support for students to enter society and pursue employment. At the same time, strengthening students’ practical abilities is also required. Specifically, the university could encourage students to participate in social practice activities, exercise their interpersonal communication skills, and form innovative composite talents with comprehensive development. In addition to focusing on talent

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cultivation concepts, teaching processes, and teaching quality, universities also need to pay attention to the construction of the external campus environment. Supporting teaching instruments and suitable teaching environments can provide a favourable soil for cultivating high-quality talents. Therefore, the government and universities can promote the comprehensive reform and development of higher education to a certain extent by increasing education investment.

By drawing on the successful experience of a comprehensive reform of higher education in eastern regions, a common approach to promote the comprehensive reform of higher education in the other areas has been explored. It suggests grasping the progress from multiple aspects, boosting the competitiveness of the entire university to a new level, improving the implementation effect of comprehensive reform in universities, building a high-quality education system, and providing high-quality talents needed by society in the new era.

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