

Measurement and Regional Differences of Digital Transformation Level of Higher Education in China

Weihua Pan^{1, a}, Rongqin Zhou^{2, b*}

¹School of Foreign Studies and Trade, Hubei University of Automotive Technology, Shiyan 442002, Hubei, China

²School of Digital Economy, Hubei University of Automotive Technology, Shiyan 442002, Hubei, China

> ^aEmail: 20220032@huat.edu.cn; ^bEmail: 202410050@huat.edu.cn *Corresponding Author

Keywords: Higher education; Digitalization; entropy weighting method; Regional difference

Abstract: This paper constructs an evaluation index system for the digital transformation and development of China's higher education from three dimensions: "digital infrastructure of higher education," "resource allocation in higher education," and "societal digitalization level." It employs the entropy-weighted TOPSIS model for measurement and utilizes the Dagum Gini coefficient to empirically study regional differences and their sources. The results indicate: (1) The digital development level of China's higher education has significantly improved, with annual average values decreasing in order from east, central, west, to northeast. (2) The overall level of digital development in higher education exhibits significant differences, with inter-provincial disparities within the eastern region being more pronounced than those within the central, western, and northeastern regions. (3) China's higher education digital development exhibits convergent characteristics. Inter-regional disparities are the primary source of overall differences in China's higher education digital development, with the number of regions experiencing an increase in the Gini coefficient exceeding those with a decrease.

1. Introduction

Against the backdrop of swift digital technology evolution, the digital transformation of China's higher education has become an urgent necessity. Digital education stands as the fundamental driving force for restructuring the higher education ecosystem. Both the 2024 Higher Education Digital Development Conference and the Higher Education Innovation and Development Conference have proposed the idea of promoting talent cultivation in higher education through digital intelligence, advocating that universities become leaders in digital transformation. Education is the foundation of a century-long plan. At the critical convergence where science and technology serve as the foremost productive force, talent acts as the core resource, and innovation functions as the prime driving force, the high-quality advancement of higher education must steadfastly embrace

digital transformation as the "determinative factor." This entails fostering the digitized and intelligent zed transformation of talent cultivation and the holistic development within universities. Based on the overall planning of China's higher education development, global educational trends, and the inherent evolution of higher education, this paper delves into new pathways for higher education digital transformation and new models for empowering high-quality development, ultimately aiming to achieve the modernization of higher education.

Research on the digital transformation of higher education primarily focuses on two aspects. First, it explores the theoretical implications and pathways. Scholars have examined the theoretical framework of digital transformation in higher education, contending that educational digitalization restructures the trajectory of higher education development [1] and serves to facilitate its high-quality advancement [2]. Qi Hongqian and other scholars emphasize that the development of digital technology has driven changes in higher education models, and universities should fully utilize digital teaching methods, share digital resources, and promote educational transformation [3]. From a practical perspective, strategies are typically formulated from policy, technology, business, and human factors to achieve the integration of humans and machines [4-6]. Rao Jinsong et al. (2025) formulated a conceptual framework for digital transformation in higher education, putting forward three core orientation dimensions and five principal implementation phases, which offers theoretical underpinnings and practical guidelines for the digital transformation of higher education [7]. Current scholarly inquiry provides a theoretical foundation and operational guidance for establishing a logical framework of higher education digital transformation. Educational digitization elevates the efficiency and value of teaching and learning through informatization and digital technologies, thereby driving high-quality progression in higher education. The pluralistic characteristics of higher education and the intricate nature of digital technologies jointly shape the transformation process, encompassing elements such as policy formulation, technological innovation, theoretical methodology renewal, and intrinsic developmental demands [8].

Second, the evaluation of the degree of digital transformation and development in higher education. Scholars in this domain predominantly focus on assessing the developmental level of higher education. Chen Bin developed a higher education development index system [9], which includes three dimensions: investment, opportunity, and quality. Zhong Yiping constructed a high-quality development index system for higher education [10], focusing on innovation, coordination, and digitalization. Zhao Zhiqiang developed an index system that covers individual, organizational, and societal levels [11].

In the field of research on digital transformation in higher education, the academic community has conducted a large number of studies. This paper integrates and absorbs the definitions of educational digitalization, the mechanisms, and pathways of educational digital transformation from previous studies. However, past research has lacked the development of an indicator system for measuring educational digital transformation. Thus, this study presents detailed assessment metrics and evaluation methodologies for educational digital transformation, constructed through the synthesis of existing scholarly insights. It undertakes an inquiry into the temporal-spatial dynamics of higher education digital transformation, thereby providing actionable recommendations to facilitate the digital transformation of China's higher education sector.

2. Construction of Index System and Research Method

2.1. Construction of Index System for the Level of Intelligent Transformation and Development of Higher Education

2.1.1. Construction of Index System

The concept of 'digitalization of education' contrasts with 'informationization of education.' Digital technology, which falls under the broader category of information technology, relies on the Internet, computers, and other software and hardware environments [12-14]. Higher education, as a comprehensive and well-structured system, undergoes digital transformation not just due to individual factors but through the interaction of multiple elements. With digital technology becoming a new engine for the high-quality development of Chinese higher education, it is crucial to further integrate digital technology into higher education [15]. The digital economy, a key driver of today's era, provides strong support and momentum for economic and social development. Its growth has broken down information barriers between universities, fostering information exchange and collaboration among them. The digital economy has brought a wealth of digital resources to higher education, with its impact extending beyond specific regions or industries to generate broader spillover effects, driving overall economic and social progress and significantly promoting the digital transformation of higher education. Against this backdrop, this paper postulates that the digital transformation of higher education is fundamentally anchored in institutional infrastructure, incorporating digital technologies and digital economic development to foster systemic digital advancement. By engaging with the core nature of higher education digital transformation and adhering to principles of data accessibility, an indicator framework is herein developed across three analytical dimensions: the maturity of educational digitization, the efficiency of higher education resource allocation, and the sophistication of societal digitalization. (See Table 1)

Primary indicators	Secondary indicators	Data Sources			
	Number of undergraduate students				
The level of digitalization	Number of specialists in cyber	China Statistical Yearbook, China Education Statistical Yearbook			
of higher education	Number of network multimedia classrooms				
	Number of teaching equipment				
Higher education	educational appropriations				
	Number of senior full-time teachers				
resource allocation	Number of universities				
	The ratio of college students to teachers				
Social digitalization level	Internet users				
	Internet broadband access users				
	Mobile Internet users				
	Mobile phone penetration				

Table 1 Evaluation index system of digital development of higher education

2.2. Research Technique

2.2.1. Entropy TOPSIS Model

Commonly employed evaluation methodologies entail certain subjective elements, which may impact the measurement outcomes. To address this limitation and more objectively gauge the degree of digital development in higher education, this research deploys the entropy-weighted TOPSIS model for indicator system development. The detailed computational procedure draws on the research outputs of Zhong Yiping [10] et al.

2.2.2. The Dagum Gini Coefficient

In previous studies, the Gini coefficient and Theil index were mainly used for differentiation analysis, but both of them had some drawbacks. To overcome the problem of cross-overlap between sample data, this study uses the Dagun Gini coefficient to analyze regional differences in the level of digital development in Chinese higher education.

3. Evaluation of the Development Level of Higher Education in Digital Intelligence

3.1. The Level of Digital Development in Higher Education in Various Dimensions

Drawing on a multi-dimensional index framework for higher education digitization development, this research evaluated the digitization development levels of China's 31 provincial-level administrative divisions (provinces, autonomous regions, and municipalities) across each dimension from 2019 to 2023, computing both their annual mean values and growth rates. Specifically, in the 'Foundation of Higher Education Digitalization' dimension, the national average was 0.0889, with Beijing leading at 0.9027 and Xizang trailing at 0.0006, highlighting significant disparities in the development of higher education digitalization among provinces. When divided into four major regions—east, central, west, and northeast—the annual averages are 0.1601, 0.0737, 0.0446, and 0.0487, respectively, showing that the east has the highest average, followed by the central region, and the west has the lowest average. There is a decreasing trend from the coast to the interior between the major regions. In the 'Allocation of Higher Education Resources' dimension, the national average was 0.3509, with Jiangsu leading at 0.8164 and Ningxia trailing at 0.0975, indicating significant differences among provinces. The annual averages for the four regions were 0.4732,0.3829,0.2380, and 0.2433, respectively, with the east leading, followed by the central region, and the west trailing. In the 'Social Digitalization Level' dimension, the national average was 0.2694, with Guangdong leading at 0.7321 and Xizang trailing at 0.0132. The annual averages for the four regions were 0.3742,0.2907,0.1919, and 0.1698, respectively, with the east still leading, followed by the central region, and the northeast trailing. Drawing from the data presented in Table 2, notable disparities exist in the degrees of higher education digitization development both across provinces and among the four major regional clusters. Among them, the eastern region performs better than other regions in all dimensions, indicating that there are significant disparities in the distribution of educational resources among provinces in China, leading to unbalanced development of higher education across regions and posing a potential risk of "digital divide."

Table 2 Annual average development level of each dimension of digital development in higher education from 2019 to 2023

Region		Higher education digitalization			ducation allocation	Social digitalization level	
	Province	rate of rise	average value	rate of	average value	rate of	average value
East	Shanghai	9.87%	0.0643	15.37%	0.3500	28.54%	0.3130
	Beijing	-1.26%	0.9027	4.24%	0.5506	6.92%	0.3241
	Tianjin	-31.87%	0.0423	3.18%	0.1991	104.12%	0.1509
	Shandong	16.87%	0.1157	20.54%	0.6542	39.34%	0.4915
	Guangdong	53.66%	0.1278	11.05%	0.8164	31.99%	0.7321
	Jiangsu	7.97%	0.1348	12.59%	0.7250	31.84%	0.5198
	Hebei	31.27%	0.0714	7.61%	0.4861	36.39%	0.3722

	Zhejiang	14.37%	0.0807	21.91%	0.5220	29.60%	0.4802
	Hainan	43.49%	0.0089	2.63%	0.1040	2.30%	0.1075
	Fujian	6.90%	0.0522	9.86%	0.3247	26.19%	0.2513
	mean	15.13%	0.1601	10.90%	0.4732	33.72%	0.3743
	Anhui	24.73%	0.0640	16.32%	0.3888	53.33%	0.2840
	Shanxi	26.77%	0.0359	3.59%	0.2332	50.15%	0.1972
Central	Jiangxi	35.42%	0.0654	9.85%	0.3453	51.35%	0.1966
section	Henan	-7.45%	0.0968	10.97%	0.5287	56.25%	0.4482
section	Hubei	1.55%	0.0957	11.60%	0.4713	55.59%	0.2630
	Hunan	22.40%	0.0770	15.21%	0.4376	69.15%	0.3048
	mean	18.33%	0.0737	11.29%	0.3829	42.76%	0.2907
	Yunnan	2.31%	0.0409	10.76%	0.2763	64.90%	0.2325
	Nei Monggol	15.48%	0.0315	9.54%	0.1902	31.55%	0.1727
	Sichuan	-13.15%	0.1205	14.13%	0.4914	41.70%	0.4462
	Ningxia	48.41%	0.0078	-17.45%	0.0975	24.83%	0.1142
	Guangxi	42.54%	0.0508	15.58%	0.2950	58.82%	0.2751
	Xinjiang	50.62%	0.0267	28.80%	0.1970	59.75%	0.1676
west	Gansu	16.30%	0.0327	7.00%	0.1902	59.30%	0.1419
West	Xizang	29.52%	0.0006	-22.63%	0.1092	91.47%	0.0132
	Guizhou	34.52%	0.0428	14.34%	0.2641	50.80%	0.2127
	Chongqing	2.49%	0.0647	18.65%	0.2564	50.52%	0.2116
	Shaanxi Province	2.78%	0.0954	9.98%	0.3794	40.76%	0.2390
	Qinghai	34.45%	0.0035	-30.50%	0.0999	60.45%	0.0969
	mean	24.85%	0.0446	3.79%	0.2380	53.84%	0.1919
northeast	Jilin	-15.81%	0.0544	-0.27%	0.2356	58.51%	0.1664
	Liaoning	-18.71%	0.1021	1.91%	0.3640	29.40%	0.2432
	the Heilongjiang River	14.88%	0.0460	0.29%	0.2964	45.59%	0.1814
	mean	12.52%	0.0487	0.26%	0.2433	54.06%	0.1698

2.1. Comprehensive Level of Digital Development in Higher Education

The comprehensive development level of digitalization in China's higher education from 2019 to 2023 was evaluated using the entropy-weighted TOPSIS model (see Table 3). As shown in Table 3, the top five provinces and cities in terms of the annual average value of higher education digitalization development are: Guangdong (0.6022), Jiangsu (0.5669), Beijing (0.5587), Shandong (0.5138), and Zhejiang (0.4710), all exceeding the 0.4500 threshold. Jilin Province, which ranks last, has an annual average value as low as 0.0042, highlighting significant disparities in the comprehensive level of higher education digitalization among provinces in China. The top five provinces in terms of annual average growth rate are: Guangxi (29.44%), Guizhou (26.63%), Chongqing (25.68%), Hunan (21.17%), and Xinjiang (21.64%). Xizang, however, ranks last with a growth rate of-22.56%. Overall, among the four major regions, the eastern region has the highest annual average value of digitalization development (0.424), followed by the central region (0.1497), and the northeastern region has the lowest (0.0154). The growth rates are: central region (12.06%), eastern region (11.79%), western region (10.37%), and northeastern region (5.81%). However, the

trend of narrowing the gap between the central and eastern regions and other regions requires further analysis using the Dagum Gini coefficient.

Table 3 The level of digital development of higher education in each province from 2019 to 2023

Region	Province	2019	2020	2021	2022	2023	Mean	Rateofrise
8	Shanghai	0.3592	0.3663	0.3864	0.4001	0.4135	0.3851	15.12%
	Beijing	0.5439	0.5545	0.5575	0.5660	0.5714	0.5587	5.07%
	Tianjin	0.2067	0.2187	0.2180	0.2331	0.2504	0.2254	21.12%
	Shandong	0.4684	0.4800	0.5181	0.5403	0.5623	0.5138	20.05%
	Guangdong	0.5677	0.5644	0.6045	0.6254	0.6490	0.6022	14.32%
East	Jiangsu	0.5502	0.5551	0.5589	0.5757	0.5944	0.5669	8.03%
	Hebei	0.3731	0.3907	0.4083	0.4239	0.4378	0.4068	17.36%
	Zhejiang	0.4509	0.4506	0.4662	0.4837	0.5037	0.4710	11.70%
	Hainan	0.1860	0.1621	0.1779	0.1812	0.1809	0.1776	-2.76%
	Fujian	0.3145	0.3095	0.3042	0.3230	0.3312	0.3165	5.31%
	mean	0.4021	0.4052	0.4200	0.4352	0.4495	0.4224	11.79%
	Anhui	0.3072	0.3106	0.3285	0.3461	0.3715	0.0208	20.92%
	Shanxi	0.2452	0.2568	0.2089	0.2212	0.2393	0.0154	-2.40%
G . 1	Jiangxi	0.2868	0.2957	0.3078	0.3223	0.3435	0.0174	19.79%
Central	Henan	0.4329	0.4586	0.4359	0.4595	0.4845	0.0159	11.93%
section	Hubei	0.3717	0.3744	0.3844	0.4024	0.4207	0.0167	13.18%
	Hunan	0.3517	0.3645	0.3679	0.3908	0.4281	0.0231	21.71%
	mean	0.3349	0.3388	0.3402	0.3566	0.3753	0.1497	12.06%
	Yunnan	0.2044	0.2124	0.2166	0.2281	0.2434	0.0118	19.13%
	NeiMonggol	0.2313	0.2398	0.2400	0.2365	0.2493	0.0044	7.76%
	Sichuan	0.3987	0.4132	0.4329	0.4465	0.4690	0.0209	17.61%
	Ningxia	0.1816	0.1887	0.1887	0.1770	0.1639	0.0076	-9.75%
	Guangxi	0.2466	0.2608	0.2709	0.2980	0.3192	0.0236	29.44%
	Xinjiang	0.1764	0.1800	0.1831	0.1817	0.2146	0.0110	21.64%
west	Gansu	0.2109	0.1897	0.1890	0.1985	0.2181	0.0106	3.41%
West	Xizang	0.2232	0.2111	0.1677	0.1601	0.1729	0.0241	-22.56%
	Guizhou	0.2293	0.2158	0.2393	0.2683	0.2904	0.0246	26.63%
	Chongqing	0.2539	0.2676	0.2787	0.2897	0.3191	0.0181	25.68%
	Shaanxi Province	0.3221	0.3229	0.3345	0.3532	0.3680	0.0164	14.23%
	Qinghai	0.2072	0.1865	0.2123	0.1699	0.1690	0.0166	-18.47%
	mean	0.2450	0.2436	0.2497	0.2543	0.2704	0.0173	10.37%
	Jilin	0.2200	0.2273	0.2209	0.2347	0.2259	0.0042	2.66%
	Liaoning	0.3280	0.3206	0.3154	0.3343	0.3534	0.0108	7.76%
Northea st	The Heilongjiang River	0.2992	0.3094	0.2823	0.2752	0.2992	0.0115	0.01%
	mean	0.2539	0.2495	0.2490	0.2538	0.2686	0.0154	5.81%

4. Analysis of regional differences in the development of higher education digital intelligence

To comprehensively investigate the variations in the degree of higher education digital development among diverse regions in China and their underlying causes, this research employed the Dagum Gini coefficient for empirical examination. The detailed analytical outcomes are presented in Tables 4 and 5.

Table 4 Overall, regional and inter-regional differences in the development of digitalization of higher education in China

A particular year		2019	2020	2021	2022	2023	Average annual
Overall gini coefficient		0.197	0.204	0.213	0.219	0.216	0.2098
	East	0.184	0.188	0.189	0.186	0.185	0.1864
Regional	Middle part	0.103	0.105	0.115	0.115	0.111	0.1098
gini coefficient	The west area	0.125	0.138	0.153	0.177	0.18	0.1546
	Northeast china	0.085	0.073	0.077	0.079	0.097	0.0822
Interregional gini coefficient	East-northeast	0.226	0.229	0.257	0.257	0.257	0.2452
	East-central	0.185	0.184	0.198	0.192	0.184	0.1886
	East-west	0.285	0.294	0.3	0.308	0.298	0.297
	Central-northeast	0.12	0.121	0.144	0.152	0.161	0.1396
	Central-western	0.188	0.204	0.203	0.218	0.217	0.206
	West-northeast	0.14	0.147	0.138	0.152	0.155	0.1464

4.1. An Overall Difference Analysis of the Development of Higher Education Digitalization

According to the results shown in Table 4, from the time series analysis, the overall degree of difference shows a fluctuating trend: from 2019 to 2020, the overall Gini coefficient increased from 0.197 to 0.204; from 2020 to 2021, it rose from 0.204 to 0.213; from 2021 to 2022, it further increased to 0.219; and from 2022 to 2023, it slightly decreased to 0.216. The data analysis indicates that, despite fluctuations, the upward trend of the Gini coefficient for the digital development level of higher education in China has outpaced the downward trend, showing an overall trend of fluctuating growth. This indicates that the gap in the level of digital development in higher education is gradually widening. In summary, there are significant overall differences in the level of digital development in Chinese higher education, with the Gini coefficient ranging from 0.197 to 0.219.

4.2. Analysis Of Regional Differences in the Development of Higher Education Digitalization

As shown in Table 4, the regional Gini coefficient exhibits a fluctuating growth trend. However, between 2022 and 2023, the Gini coefficients for the central and eastern regions showed a decreasing trend. Specifically, the Gini coefficient for the eastern region decreased from 0.186 in 2022 to 0.185 in 2023, a decrease of 0.001; the central region's Gini coefficient decreased from 0.115 to 0.111, a decrease of 0.004, indicating that the gap in digital development of higher education among provinces in the central region is gradually narrowing. In contrast, the Gini coefficient in the western region increased from 0.125 in 2019 to 0.18 in 2023, an increase of 0.055; the northeastern region's Gini coefficient increased from 0.086 to 0.097, an increase of 0.011. Overall, among the four major regions, the eastern region had the highest average annual Gini

coefficient (0.1864), followed by the western region (0.1546), and the northeastern region had the lowest (0.082). Of particular concern is that the average annual Gini coefficient within the eastern region was significantly higher than that of the other three regions, revealing that the regional disparities in the level of digital development of higher education were most pronounced in this region.

4.3. Analysis of Regional Differences in the Development of Higher Education Digitalization

According to the data in Table 4, the Gini coefficient between the East and West regions has the highest annual average at 0.297; the second highest is the East and Northeast region, with a Gini coefficient of 0.2452; the lowest is the Central and Northeast region, with an annual average of 0.1396. The Gini coefficients for the west-northeast region (0.1464) and the central-west region (0.206) are at a moderate level. There are significant differences between the eastern and northeastern regions in terms of the digitalization of higher education, which may be due to the large gap in economic development between the two regions. The economic development gap between the western and northeastern regions is relatively small, which also leads to a relatively small gap in the level of digital development of higher education between these regions. Observing the trend changes, the Gini coefficients of different regions vary, with only the East and Central region showing a downward trend, while other regions generally show a fluctuating upward trend. Specifically, the Gini coefficient for the East-Central region decreased from 0.185 in 2019 to 0.184 in 2023, while the East-Northeast, East-West, and Central-Northeast regions showed an upward trend. The Central-Northeast region saw the largest increase in the Gini coefficient, rising from 0.12 in 2019 to 0.161 in 2023. Overall, more regions are experiencing an upward trend than a downward one, indicating that the regional disparities in the development of higher education digitalization in China are expanding due to varying regional conditions.

4.4. Analysis of the Source and Contribution Rate of the Difference in the Development of Higher Education Digitalization

Table 5 Overall differences in the development of digitalization of higher education in China and their contribution rates

		2019	2020	2021	2022	2023	Average annual
Sources of variation	In the region	0.044	0.045	0.048	0.05	0.051	0.0476
	Between regions	0.12	0.121	0.126	0.13	0.124	0.1242
	Hyper-density	0.034	0.038	0.039	0.039	0.042	0.0384
Contribution rate	In the region	22.07%	22.23%	22.67%	22.99%	23.42%	22.68%
	Between regions	60.67%	59.40%	59.06%	59.13%	57.15%	59.08%
Tate	Hyper-density	17.26%	18.38%	18.27%	17.88%	19.43%	18.24%

According to the data in Table 5, during the entire study period, the highest annual average Gini coefficient between regions was 0.1242, while the annual average within regions was 0.0476; the annual average Gini coefficient for super variable density was the lowest, at 0.0384. These data indicate that regional differences in the digital development of higher education in China are the most significant, followed by intra-regional differences, with ultra-high density differences being the smallest. From a time series perspective, the annual contribution rate changes for both intra- and inter-regional differences, as well as ultra-high density differences, are not significant. The

contribution rate of regional disparities fluctuates between 57.15% and 60.67%, the contribution rate of regional disparities fluctuates between 22.07% and 23.42%, and the contribution rate of super variable density fluctuations between 17.26% and 19.43%. The average annual maximum contribution rate of interregional differences was 59.08%, further emphasizing that interregional differences are the main factor contributing to disparities in the digital development of higher education in China.

5. Conclusions and Policy Recommendations

This paper constructs an indicator system for measuring the digital development of higher education in China, covering three main aspects: "digital infrastructure in higher education," "resource allocation in higher education," and "social digitalization level." Using the entropy-weighted TOPSIS model, we assessed the level of digital development in higher education in China's 31 provinces, autonomous regions, and municipalities from 2019 to 2023. Furthermore, we used the Dagum Gini coefficient to analyze the differences in the level of digital development in higher education across these regions and their changing trends, ultimately arriving at the following key conclusions:

- (1) The level of digital development in Chinese higher education has improved significantly, with the annual average values decreasing in order from east to west, central to west, and northeast to west. Among these, the eastern region has the highest comprehensive development level in all three aspects, followed by the central and northeast regions, with the western region having the lowest level. In terms of social digitalization, the eastern region has the highest level, followed by the central region, with the northeast region having the lowest level.
- (2) There are significant differences in the overall level of digital development in higher education. Among these, the differences between provinces in the eastern region are more pronounced than those between provinces in the central, western, and northeastern regions.
- (3) The digital development of higher education in China shows a convergent trend. Regional differences have become the dominant factor causing overall disparities in the digital development of higher education in China, with the number of regions experiencing an increase in the Gini coefficient exceeding the number experiencing a decrease.

Based on this, this paper proposes the following recommendations:

(1) We will increase investment in digitalization

Increase investment in digital infrastructure to enhance network service capabilities and the stability of teaching platforms, ensuring the smooth implementation of digital education. By developing technologies such as cloud computing, big data, and artificial intelligence, promote the digital management and sharing of educational resources, breaking through the limitations of traditional educational models, and providing more efficient digital learning experiences for teachers and students. Provide targeted support for digital infrastructure, particularly by allocating more funds to regions with lower levels of digitalization, to ensure high-quality education development nationwide.

(2) We will increase support for education in the western and northeastern regions

There are still significant gaps in the development of digital education in western and northeastern regions. Policy guidance and financial support are needed to accelerate the construction of digital infrastructure in universities in these regions. By providing special funds and technical assistance, we can promote the development of remote education platforms and online educational resources, thereby facilitating the cross-regional sharing of educational resources. Local universities are encouraged to collaborate with internet companies and high-tech firms to introduce advanced digital education technologies and equipment, ensuring a balanced distribution of

educational resources, narrowing regional disparities, and promoting balanced educational development across regions.

(3) We will promote the optimal allocation of educational resources and promote equity in education

To build a unified digital resource platform that integrates high-quality educational resources nationwide, promoting the sharing of resources across schools and regions, ensuring that students in remote areas can also access quality educational services. By leveraging big data and artificial intelligence technologies, we aim to achieve precise allocation of educational resources and personalized teaching, providing tailored learning plans for students from diverse backgrounds. We will also promote cooperation in educational resources among universities to enhance educational equity and improve overall educational quality.

Funding

This work was supported by the Education Scientific Project of Hubei Provincial Department of Education titled "Research on the Mechanism and Path of Educational Digitalization Empowering the High-Quality Development of Higher Education in Hubei" (2023GB032).

References

- [1] Yuan Zhenguo. Digital Transformation of Education: What to Transform and How to Transform [J]. Journal of East China Normal University (Educational Science Edition), 2023,41(03):1-11. DOI:10.16382/j.cnki.1000-5560.2023.03.001.
- [2] Chen Tingzhu and Guan Hui. Digitalization of Education: Transformation or Empowerment [J]. China Distance Education, 2023,43(06):11-18. DOI:10.13541/j.cnki.chinade.2023.06.001.
- [3] Qi Hongqian and Zhang Jiaxin. Development of Digital Technology and Reform of Higher Education Teaching Model [J]. China Higher Education, 2022, (18):56-58.
- [4] Yu Shengquan. Key Paths for the Digital Transformation of Education [J]. Journal of East China Normal University (Educational Science Edition), 2023,41(03):62-71. DOI: 10.16382/j. cnki.1000-5560.2023.03.007.
- [5] Liu San Nv Ya, Hao Xiaohan, and Li Qing. The Chinese Path to Digital Transformation in Education [J]. China Educational Technology, 2023, (01):52-61.
- [6] Wang Xingyu. Digital Transformation and the High-quality Development of Higher Education: Coupling Logic and Implementation Path [J]. Social Sciences Front, 2023, (01):236-244.
- [7] Rao Jinsong, Li Wei, and Li Heng. Research on Digital Transformation Strategies in Higher Education Institutions [J]. China University Teaching, 2025, (03):52-60.
- [8] Ji Kai and Zhang Zhihua. The Logical Framework and Optimization Strategies for the Digital Transformation of Higher Education [J]. Jiangsu Higher Education, 2023, (10):39-46. DOI: 10.13236/j.cnki.jshe.2023.10.015.
- [9] Chen Bin. An Analysis of the Inter-provincial Differences in the Development Level of Higher Education in China Evidence Based on the Higher Education Development Index [J]. Fudan Education Forum, 2016,14(04):76-82+88. DOI: 10.13397/j.cnki.fef.2016.04.013.
- [10] Zhong Yiping and Li Ying. Measurement of High-Quality Development Levels in Tourism, Regional Differences, and Convergence Characteristics [J]. Statistics & Decision, 2022,38(21):107-112. DOI: 10.13546/j.cnki.tjvjc.2022.21.021.
- [11] Zhao Zhiqiang. Measurement and Temporal-Spatial Evolution of High-Quality Development in Higher Education [J]. Statistics and Decision, 2023,39(16):37-42. DOI: 10.13546/j.cnki.tjyjc. 2023.16.007.

- [12] Baili Qingfeng, Li Xinqi. Digital and Intelligent University: Connotation, Main Characteristics, and Implementation Path [J]. Chongqing Higher Education Research, 2025,13(02):41-49. DOI: 10.15998/j.cnki.issn1673-8012.2025.02.005.
- [13] Tian Tiejie. The Intrinsic Logic, Real Challenges, and Action Conception of Digital Intelligence Empowering the Modernization of Higher Education Governance [J]. Journal of Northwest Normal University (Social Sciences Edition), 2025,62(01):98-108. DOI: 10.167 83/j.cnki.nwnus.2025.01.011.
- [14] Wang Huaxu and Hu Qinxiao. Why the Digitalization of Higher Education Becomes a National Strategy-An Analysis Based on Multi-source Flow Theory [J]. Higher Education Development and Evaluation, 2025,41(02):22-33+130.
- [15] Fan Jiabao and Liu Hui. The Logical Framework and Quality Improvement Strategies for the Digital Transformation of Higher Education Governance Grounded Theory Research Based on Policy Texts [J]. Journal of Liaoning Administrative College, 2024, (05):29-37. DOI: 10.13945/j.cnki.jlac.2024.05.012.