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Original Paper

Progress, Hotspots, and Trends in Research on Higher Education Majors in China: A Visual Analysis Based on CiteSpace Knowledge Mapping

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Abstract

To promote the development of majors in China's higher education system, this study takes research literature related to the development of higher education programs from 1992 to 2024 as its object of analysis and uses quantitative analysis to examine research progress, hotspots, and development trends. Based on the CNKI database, literature was retrieved using "higher education" and "major construction" as subject terms. CiteSpace, a quantitative visualization software, was then employed to conduct knowledge mapping analysis. The results show that the number of research outputs on higher education programs in China has changed dynamically over time; a stable research echelon among authors has not yet been formed; higher education institutions constitute the main body of publishing institutions, but inter-institutional collaboration still needs to be strengthened; highly cited literature focuses on core theoretical and practical issues; high-frequency keywords reflect the central concerns of the field; and keyword clustering presents clear research directions. At present, research on higher education programs in China shows three major trends: first, it is oriented toward the integration of theory and practice, thereby achieving multidimensional and in-depth development; second, the construction of new liberal arts plays a leading role, while the exploration of vocational undergraduate programs has become an important branch; third, research methods are becoming increasingly diversified, and interdisciplinary approaches are being applied more widely, providing strong theoretical support for the development of higher education programs.

Keywords

higher education, major construction, CiteSpace knowledge mapping

1. Introduction

Academic programs are an important carrier through which higher education cultivates qualified talent[i]. It has therefore become increasingly urgent for research on China's higher education to focus on academic programs. Only by taking academic programs as an entry point, examining changes in China's higher education programs, exploring the objective laws governing their development, adjusting program structures in response to the times, and promoting the alignment between university talent cultivation and the needs of various sectors of society can higher education better play its leading role in building China into a leading country in education in the era of digital intelligence. [ii]Therefore, it is necessary to clarify the current state of academic programs in China's higher education, identify problems from existing conditions, and define the future direction of program development. All of these require an in-depth review and analysis of the developmental characteristics of China's higher education programs. This paper mainly employs CiteSpace to comprehensively and systematically examine the research subjects, collaborative relationships, developmental trajectory, stage-specific hotspots, and future trends in this field.

Existing reviews of research on academic programs in China's higher education can be summarized in three aspects. First, some studies focus on the layout of academic programs in China's higher education. Liu Fuxing et al.[iii] argue that China's higher education still needs to be adjusted and optimized in terms of type structure, disciplinary structure, program structure, and regional layout in accordance with economic and social development, especially the trends of technological iteration and the development requirements of new quality productive forces. Jia Yongtang[iv] maintains that, along with economic and social development and changes in the institutional mechanisms of higher education, the gap in the comprehensive strength of provincial higher education has gradually widened, leading to the formation of an unbalanced layout structure in China's higher education. This structure reflects disparities in the overall level of higher education development, which are shaped by the interaction of basic scale, key elements, and core outputs. Based on statistics on the addition and withdrawal of academic programs in Chinese higher education institutions from 2018 to 2023, Liang Yucheng et al.[v] find that, under the influence of interdisciplinary integration among different programs, other program categories have been affected to varying degrees by the diffusion of intelligent-technology-related programs. They suggest that higher education institutions should guide students in all programs to improve their technological adaptability, strengthen program integration in response to social needs, and be fully prepared for the dynamic substitution of programs.

Second, some studies examine the connotative development of undergraduate program education. Liu Haitao[vi] argues that, as China's higher education has deepened its understanding of the connotation and role of undergraduate program establishment, the analysis of power relations among institutional actors in undergraduate program establishment has become increasingly important. Yan Guangcai [vii]holds that undergraduate education in modern China is characterized by a mixture of the Soviet model and the American model. It is precisely this characteristic that has caused China's undergraduate

education to waver between general and specialized education, and between breadth and depth. As a result, the number of courses has expanded, the organic connections among courses in different programs remain insufficient, and course content often fails to meet the requirements of deep learning. Feng Yong et al. [viii] propose that it is necessary to clarify the new connotations of undergraduate program development in the era of artificial intelligence, so as to cultivate undergraduates' and postgraduates' ability to solve complex engineering problems based on big data intelligence, as well as their high-quality innovation and entrepreneurship capabilities driven by big data intelligent technologies.

Third, some studies draw on cases of talent cultivation in foreign higher education programs to provide references for the development of China's higher education. Wu Zhongjiang et al.[ix] argue for the establishment of a talent cultivation system that gives equal importance to degrees and academic programs. They note that German higher education long held a leading position, setting an example and offering lessons for the development of higher education in other countries. Zhao Jinmin et al.[x], by reviewing the history and current situation of the large number of professional master's degrees established in American higher education, find that the degree authorization system, professional qualification certification system, higher education industry standards, and professional internship system serve as institutional guarantees for its development. These systems help realize the linkage between higher education programs and university administration, and provide useful references for the cultivation of administrative management and higher education studies talent in Chinese universities.

A review of previous studies shows that, in terms of content, research on academic programs in China's higher education has mainly focused on the background and causes of program adjustment, while systematic review and analysis remain insufficient. In terms of methodology, existing studies have primarily relied on subjective content interpretation, with relatively few employing scientometric tools for objective analysis. In view of this, this paper uses CiteSpace, a scientometric software widely recognized in the current academic community, as its research tool to conduct a visual analysis of this issue. It aims to objectively present the developmental trajectory and future directions of research in this field, thereby providing new ideas and orientations for its further development.

2. Research Design

2.1 Data Sources

Given the strong timeliness and high recognition of journal literature, which is conducive to presenting the historical state and developmental trajectory of a research topic, this study selected two sub-databases in CNKI: Chinese Core Journals and CSSCI journals. Literature was retrieved using "higher education" and "major construction" as subject terms. A total of 1,229 articles were initially retrieved. To improve the accuracy and reliability of the retrieval results, non-research papers such as topic selection guides, conference reviews, column introductions, news notices, journal catalogues, new book recommendations, and book reviews were manually excluded from the papers generated through

the retrieval procedure. Finally, 1,035 valid journal articles were obtained.

2.2 Research Tool

This study adopts CiteSpace as its research tool. CiteSpace, short for Citation Space, can be translated as "citation space." It is an information visualization software based on language analysis theory and developed by Dr. Chen Chaomei using the Java programming language[xi]. The software can read information such as authors, institutions, and keywords from imported literature and conduct co-citation and coupling analyses. It can generate visual maps such as author collaboration networks, institutional collaboration networks, keyword co-occurrence maps, and keyword clustering maps. By presenting the structure, patterns, and distribution of scientific knowledge through visualization, the interpretation of these maps can help form a basic understanding of the current research status and future trends in the field.

The first piece of literature on undergraduate program development in China appeared in 1992. Therefore, the time span of this study is set from 1992 to 2024, with a single time slice of one year. To grasp the research trajectory, core forces, themes, and related development trends of academic program research in modern Chinese higher education, this study uses the experience summary method to organize and analyze literature data on academic programs in China's higher education. It reviews the developmental trajectory of the field, summarizes its characteristics and shortcomings, and, in light of the new tests and challenges facing discipline development in China's higher education in the new era, reasonably predicts future research trends in China's higher education and looks ahead to new directions for the development of higher education in the new era on the basis of fully understanding existing foundations and objective realities.

3. Analysis of Research Results

3.1 Research Trajectory

The research trajectory is analyzed and organized mainly from the temporal and spatial distribution of studies on academic programs in higher education.

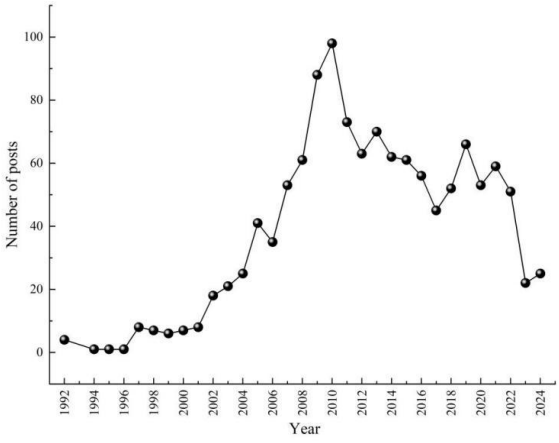

Figure 1. Distribution of Research Literature from 1992 to 2024

The number and chronological distribution of published literature can reveal the academic evolution of a given field. The number and temporal distribution of papers related to academic programs in higher education are shown in Figure 1. From 1992 to 2006, the number of publications fluctuated only slightly and remained generally stable. Publication output rose sharply from 2006 to around 2010 and subsequently fluctuated at a relatively high level. After a marked decline in 2023, a slight rebound was observed in 2024. The development of higher education and the development of academic programs in higher education have increasingly become a focus of attention in both academia and practice.

(1) Exploratory Stage (1992-2003)

During this period, scholars' research on academic programs mainly focused on the market logic of program development, marking an initial stage of exploring the relationship between academic programs and the market. At that time, adjustments to various university programs were urgently needed to contribute to China's rapid economic development. Therefore, relevant research topics mainly revolved around how different academic programs could be integrated with market demand. For example, Yang Jinchun [xii]proposed the mutual integration of "service" and "economy," emphasizing the coordinated development of education and the economy. Zuo Tieyong[xiii] argued that, in response to the requirements of economic and social development, scientific and standardized catalogues of disciplines and academic programs should be implemented to promote discipline development and talent cultivation. Li Guoxiang and Zhang Xinming[xiv] pointed out that, in facing the new era, emerging programs suited to the development of modern education should be developed, concepts of program development should be updated, and specialized talent oriented toward the market economy should be cultivated. Feng Xiangdong[xv] discussed how undergraduate program structure adjustment and program development in universities should be carried out in response to the transformation of China's economic structure, so as to better support the development of top innovative talent. Overall, this period mainly explored how academic programs could better cultivate the talent needed by society in the context of adjustments to China's economic structure. At this stage, research on the development of academic programs in higher education had not yet generated significant academic attention, and both research topics and research content were relatively limited.

(2) Development Stage (2004-2011)

At the beginning of the new century, in the face of accelerated globalization, rapid scientific and technological progress, the expansion of higher education enrollment, and breakthrough progress in higher education system reform, the establishment and adjustment of disciplines and academic programs became an important topic of scholarly concern. Wang Jianhua[xvi] discussed the relationships among discipline development, curriculum development, and program development. By elaborating on the connotations of discipline development, curriculum development, and program development respectively, he analyzed their interrelationships and argued that the three are internally connected and should be organically integrated in the process of development. Huang Zihua et al.[xvii] proposed that many contradictions still existed between the establishment of disciplines in higher education and their

autonomous adjustment. To promote the scientification and standardization of discipline and program establishment and adjustment, it is necessary to actively clarify the relationships among various actors involved in discipline establishment and adjustment, take market demand as the orientation, base development on the cultivation of students' qualities, and resolve various contradictions in the process. Qiu Xiaojie et al.[xviii] argued that, against the background of the massification of higher education, local universities must accurately define their positioning, take serving regional economic development as their educational goal, scientifically analyze regional industrial development trends, regard program development as the leading force, establish mechanisms for program development, establishment, and adjustment in close alignment with local economic needs, and thereby realize the interactive development of higher education and the regional economy. During this stage, discussions on the development of academic programs in higher education increased significantly, and the topics discussed became more diversified. However, relatively in-depth insights into the deepened development of academic programs in higher education had not yet been fully formed.

(3) Deepening Stage (2012–2024)

With the advent of the information and digital era, the development of academic programs in higher education has placed greater emphasis on adjustment and innovation. Meanwhile, the development of the scientific and technological revolution and the industrial revolution has endowed the concepts, resources, models, and standards of higher education programs with new meanings. Against this background, the development of first-class undergraduate programs has become increasingly urgent. Fu Weili[xix] argued that, in an era when higher education is accelerating its massification and society's demand for talent structures is constantly changing, universities must continuously adjust their program structures. However, in the process of program adjustment and transformation, they should pay attention to the relationship between inheritance, adaptation, and guidance; properly handle the relationship between meeting social needs and cultivating students' abilities; and coordinate the relationships among different types and levels of higher education institutions. Liu Haitao[xx], through an analysis of the characteristics and internal contradictions of diversified, pluralistic, and developmental quality perspectives in the establishment of undergraduate programs in Chinese universities, argued that quality construction in undergraduate program establishment should clarify the logic of diversity and flexibility, the value pursuit of plurality and balance, and the strategic direction of innovation and leadership. Wang Jianhua[xxi] proposed that the "Double Ten Thousand Plan" focuses on undergraduate program sites and aims to strengthen first-class undergraduate education, build first-class programs, and cultivate first-class talent. It has a certain guiding role in encouraging universities to concentrate on undergraduate talent cultivation and improve their talent cultivation capacity. However, due to its short construction cycle, large scale, and reliance on local governments and universities for funding coordination, the "Double Ten Thousand Plan," in relation to "first-class undergraduate programs," is more a planned selection mechanism than a process of focused construction. Wu Zhengyang et al.[xxii] argued that future program structure adjustment should align with national

strategies and industrial development needs, adhere to academic logic as its fundamental principle, and explore interdisciplinary and integrated "broad programs" oriented toward disciplinary frontiers. At the same time, universities should preserve the distinctive foundations of "traditional" and "less popular" programs, avoid blindly following policy and market trends by unrealistically "chasing the new" and "cutting the old," and focus program development on connotative construction such as curriculum systems rather than merely pursuing new names and new institutional forms. At this stage, more profound insights have been proposed regarding the development of academic program construction in higher education. In response to scientific, technological, and information revolutions, the construction of first-class undergraduate programs urgently needs to adapt through continuous adjustment.

3.2 Spatial Distribution

Spatial distribution mainly examines the spatial characteristics and collaborative relationships formed by researchers and their affiliated institutions. Overall, over the past 30 years, scholars engaged in research on academic programs in higher education have been led by a small number of core figures, and a certain degree of collaboration has formed on the basis of sound teacher–student relationships. In terms of research institutions, higher education institutions constitute the main body, while higher education research institutes serve as a supplementary force.

(1) Distribution of Publishing Authors

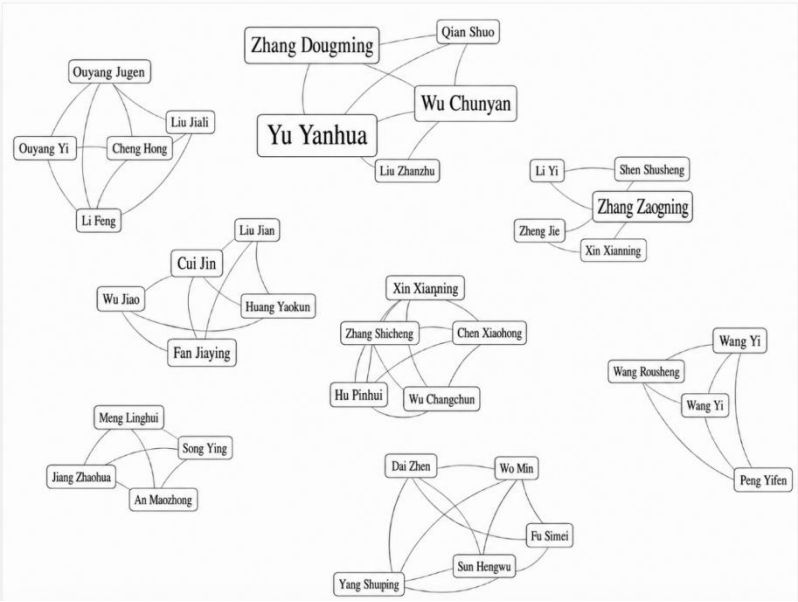

Figure 2. Core Author Relationship Network in Higher Education Research

To gain an in-depth understanding of research progress in a particular field, it is necessary to analyze the core authors in that field. The research outputs of core authors are representative of the research level and research direction of the field. According to Price's law, m = 0.749(ηmax)1/2, where ηmax represents the maximum number of publications by an author, and authors who have published no fewer than m papers are regarded as core authors[xxiii].

In this study, ηmax = 9, yielding m = 2.247. Since the number of publications is an integer, authors with three or more publications were identified as core authors. Accordingly, 13 authors met the criterion for core authors, four have published five or more papers, and only two have published seven or more papers. This indicates that there are relatively few highly productive authors, and that considerable research space remains in this field.

Meanwhile, using authors as the node type in CiteSpace, the core author collaboration network of research on higher education program development was generated, as shown in the figure. The operation report shows that there are 517 author nodes and 209 links, with a network density of 0.0016 and a Q value of 0.9868. "A Q value greater than 0.3 indicates that the detected community structure of the network is significant; the closer the value is to 1, the better the clustering effect of the network."[xxiv] As shown in Figure 2, the links among core authors in the field of higher education program development are relatively few and dispersed, and the node density is low. This indicates that collaborative relationships in this field are relatively scattered and are mostly confined to cooperation within the same institution. Overall, a multi-level and cohesive research team has not yet been formed, and the frequency and intensity of collaboration among scholars still need to be improved.

(2) Distribution of Research Institutions

Using CiteSpace to analyze the selected valid samples. The analysis shows that a total of 499 research institutions are involved, covering multiple types of entities, including research institutes, higher education institutions, editorial and publishing organizations, and government organizations. Among them, the institutions with five

or more publications mainly include the School of Education,Tianjin University (5 papers), the School of Educational Science of Nanjing Normal University (5 papers), Beijing Foreign Studies University (5 papers), Harbin University (6 papers), the School of Education of Huazhong University of Science and Technology (7 papers), and the School of Marxism of Wuhan University (8 papers). In terms of publication volume, higher education institutions and higher education research institutes account for a relatively large proportion and constitute the main publishing bodies. With regard to inter-institutional collaboration, the 499 nodes are connected by only 96 links, with a network density of 0.0008. This indicates that cooperation and communication among institutions remain insufficient, and cross-institutional collaboration needs to be further strengthened.

(3) Analysis of Highly Cited Literature

Citation frequency is one of the important indicators of the influence of academic achievements[xxv]. To further investigate the citation status of research outputs in the field of higher education program development, this study selected the top 20 most-cited articles in the field, as shown in Table 1.

Table 1. Top 20 Highly Cited Publications in the Field of Higher Education Studies

	Article title	Author	Year	Source of the journal	Number of citations/citation
1	The Construction of China's New Engineering Disciplines for the Future	Lin Jian	2017	Tsinghua Journal of Education	1859
2	On Academic Breakthrough in the Construction of Double “World-class”On the Integrative Construction of Discipline, Specialty and Course in University	Zhou Guangli	2016	Educational Research	642
3	Discipline, specialty construction and talents cultivation	Feng Xiangdong	2002	Journal of Higher Education	613
4	Study on the Talents Cultivation of Undergraduate Sport Majors in China-Development and Interpretation about National Standard for Teaching Quality of Undergraduate Sport Majors in Colleges and Universities	Huang Hansheng, Chen Zuosong, Wang Jiahong, Ji Liu, Fang Qianhua, Jia Mingxue	2016	China Sport Science	387
5	The Transformation and Development of Local Colleges and Universities and the Establishment of Colleges and Universities of Applied Science	Dong Liping	2014	Educational Research	355
6	First-class undergraduate education is a key component of the “Double First-Class”initiative	Zhong Binglin	2016	China University Teaching	327
7	The Development of New Engineering Disciplines: Leading the Way in Higher Education	Lin Jian	2017	China Higher Education	284

	Article title	Author	Year	Source of the journal	Number of citations/citation
	Reform				
8	The curriculum ideological and political construction of sports major should address the problems and the implementation path	Fan Sanming, Li Mengxin, Zhu Chunshan, Dong Cuixiang, Ji Liu	2021	Journal of Physical Education	265
9	The philosophy of professional accreditation drives the quality-led development of engineering programs	Chen Ping	2014	China University Teaching	249
10	On the specialty construction in higher vocational colleges	Li Jianqiu	2003	Journal of Higher Education	206
11	Research and Exploration on the Cultivation Model of Professionals for Primary Education	Wang Zhiqiu	2007	Educational Research	188
12	Thoughts on the Construction of Top Undergraduate Major:Comments on “Double Ten-Thousand Plan”	Wang Jianhua	2019	Chongqing Higher Education Research	167
13	Survey and Analysis of the Current Status of the Supervision Team for Full-time Professional Master’s Degree Students	Shi Yaling, Xiang Xinghua, Li Ruoying, Xiao Yuanliang	2011	Academic Degrees & Graduate Education	166
14	On the Relationships of First-class Discipline Construction in Universities	Zhang Dexiang	2016	Educational Research	165
15	Path Choosing of High-level Groups of Majors in Higher Vocational Colleges	Zhang Hong	2019	China Higher Education Research	155

	Article title	Author	Year	Source of the journal	Number of citations/citation
16	New Engineering, New Medicine, New Agriculture and New Humanities – From Educational Philosophy to a Paradigm Shift	Ma Luting	2022	China Higher Education	146
17	The Path of Development for the Educational Technology Discipline in China	Nan Guolong	2005	e-Education Research	131
18	Reflections on and Design of the Basic Framework for Talent Development Programs in Higher Vocational Education	Yao Shouguang	2006	China Higher Education Research	127
19	Research on Construction of Professional Teaching Database in Higher Vocational Education	Tong Weijun, Jiang Tao	2016	China Higher Education Research	116
20	Construction and Practice of Higher Education Teaching Quality Supervision System	Gao Haisheng, Hu Taoyuan, Xu Maozu, Xiong Guoliang	2006	Educational Research	114

In summary, from the perspective of temporal trajectory, the development of academic programs in China's higher education can be divided into three stages: the exploratory stage, the development stage, and the deepening stage. In the exploratory stage, research on the development of academic programs in higher education had not yet attracted significant academic attention, and both the research themes and research content were relatively limited. In the development stage, discussions on higher education program development increased markedly, and research topics became more diverse; however, relatively in-depth insights into the further development of academic programs in higher education had not yet been fully formed. In the deepening stage, more profound perspectives on the development of higher education program construction emerged. In response to scientific, technological, and information revolutions, the construction of first-class undergraduate programs urgently needs to adapt through continuous adjustment.

In addition, an analysis of the spatial trajectory of higher education program development shows that, in terms of author distribution, there are relatively few highly productive authors, the frequency and

intensity of collaboration among authors remain low, and cohesive research teams are lacking. In terms of institutional distribution, cooperation and communication among institutions are insufficient, and cross-institutional collaboration still needs to be strengthened. Finally, from the perspective of highly cited literature, research on higher education program development is closely linked to the needs of social development, and this field has become one of the important focuses of scholarly attention.

3.3 Analysis of Research Hotspots and Frontiers

Keywords are the core information for literature retrieval and provide a highly condensed summary of research themes. Their frequency and degree of association can reveal the research hotspots in a given field[xxvi]. In the figure, circles represent keyword nodes, and the larger the circle, the higher the frequency of the corresponding theme.

(1) Analysis of the Keyword Co-occurrence Map

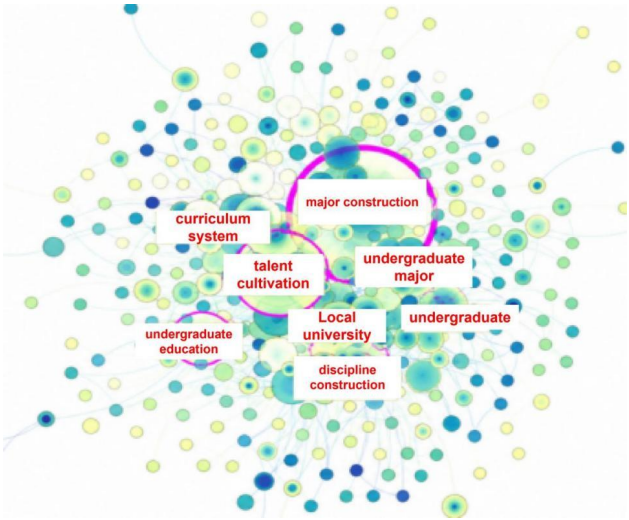

Figure 3. Keyword Co-occurrence Network of Research on Higher Education Major Construction

Keywords are highly condensed and refined expressions of the themes of literature. By analyzing high-frequency keywords in the literature, it is possible to reveal the research hotspots, trends, and relationships among different research themes in the field. CiteSpace was used to conduct keyword clustering analysis, with terms sharing obvious common characteristics among the keywords taken as clustering objects. In this way, the keyword map of research on academic programs in higher education was obtained. A total of 450 nodes and 854 links were generated, with a network density of 0.0085, a Q value of 0.5738 ($Q > 0.3$), indicating a significant clustering structure, and an S value of 0.851 ($S > 0.7$), indicating that the clustering results are convincing. The keyword co-occurrence map of research on higher education program development from 1992 to 2024 is shown in the figure. In the map, citation rings present the relevant nodes, and the size of each ring reflects the frequency of keyword occurrence. The size of each ring reflects the frequency of the corresponding keyword, with larger rings indicating more frequent occurrence. As shown in Figure 3, major construction, talent cultivation, undergraduate

education, undergraduate major, and curriculum system constitute the five most prominent keyword nodes. Their central positions and extensive links with other nodes suggest that these topics have received sustained scholarly attention. In particular, they are closely associated with major adjustment, major structure, talent cultivation plan, first-class undergraduate major, new engineering education, and new liberal arts. The connections among these keywords suggest that research on academic majors in higher education has gradually developed a relatively coherent thematic structure.

(2) Analysis of the Keyword Clustering Map

To further identify the main themes within this field, keyword clustering was performed using CiteSpace. Keywords with similar characteristics and close associations were grouped into the same cluster, producing the clustering map presented in Figure 4. Twelve clusters were identified: #0 Major Construction, #1 Talent Cultivation, #2 Major, #3 Issues, #4 Discipline Construction, #5 First-Class Academic Majors, #6 Featured Academic Majors, #7 Curriculum System, #8 Undergraduate Education, #9 Teaching Quality, #10 Undergraduate, and #11 Cultivation Objectives. These clusters provide a more structured picture of the major topics addressed in existing studies and make it possible to identify the main thematic areas of research on academic programs in higher education.

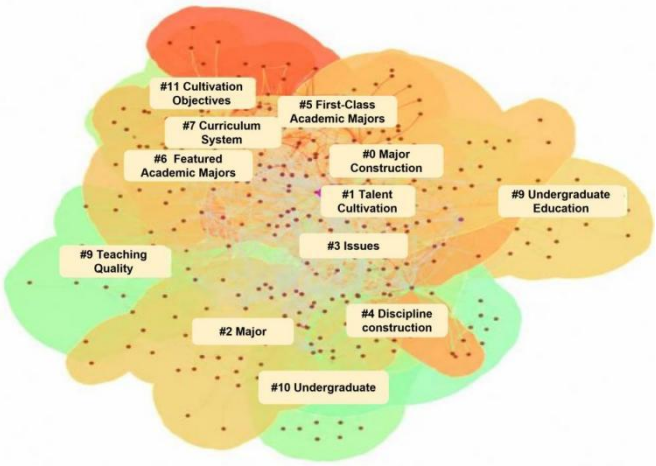

Figure 4. Keyword Clustering Network of Higher Education Major Research

3.4 Analysis of Hotspot Themes

(1) Analysis of the Keyword Burst Map

Keyword burst detection, together with time-zone analysis, helps reveal how research interests have shifted over time. In this study, the 17 keywords with the strongest citation bursts were selected for analysis, and the results are presented in Figure 5. Several characteristics can be observed from their emergence, duration, and burst strength.

With regard to the emergence of research hotspots, discipline development, undergraduate education, innovation, and featured academic majors attracted scholarly attention relatively early, particularly during the period from 2004 to 2008. In contrast, new liberal arts and vocational undergraduate education appeared much later, with their citation bursts beginning in 2020 and 2022, respectively. This

temporal difference reflects changes in the policy environment and the evolving priorities of higher education development.

The duration of citation bursts also varies considerably across topics. Industry–education integration remained active for six years, from 2019 to 2024, indicating sustained academic interest. First-class academic majors and featured academic majors likewise maintained considerable research attention. More recently, the bursts associated with new liberal arts and vocational undergraduate education continued through 2024, suggesting that these topics remain active areas of inquiry.

In terms of burst strength, transformation and development recorded the highest value, at 7.54. This result corresponds with the continuing transformation of academic programs in Chinese higher education. Other terms, including first-class academic majors, featured academic majors, and new liberal arts, also displayed strong citation bursts. Of particular note is the rapid rise of new liberal arts after 2020. Its growing visibility within a relatively short period suggests that it has become an important emerging direction in research on higher education program development.

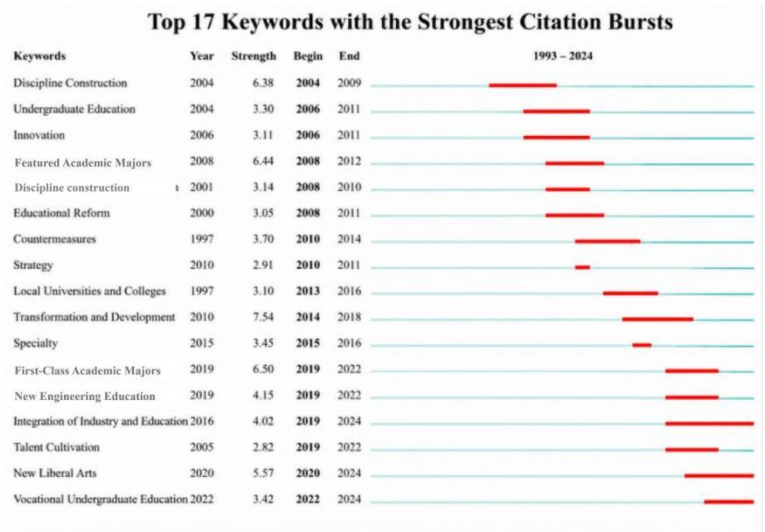

Figure 5. Keyword Burst Detection Map of Higher Education Major Research

(2) Analysis of the Keyword Time-Zone Map

The keyword time-zone map provides a chronological view of changes in the major research themes. Based on CiteSpace analysis, Figure 6 presents the evolution of keywords in the field of higher education program development. Keywords located along each cluster line represent the principal topics discussed at different stages of the research period.

The results show that #2 Major, #3 Issues, and #9 Teaching Quality extend across a relatively long period, from 1997 to 2024, and contain keywords appearing at multiple points in time. This continuity suggests that these themes have remained fundamental concerns as higher education has developed. Other clusters, including #0 Major Construction, #1 Talent Cultivation, #4 Discipline Construction, #5 First-Class Academic Majors, #7 Curriculum System, and #8 Undergraduate Education, appeared

somewhat later but have remained active in recent research. Their persistence indicates the continuing importance of these topics to the development and reform of academic programs.

By comparison, #6 Featured Academic Majors, #10 Undergraduate, and #11 Cultivation Objectives are more concentrated within particular periods, reflecting stronger stage-specific characteristics. The most recent part of the map also reveals several emerging topics since 2024, including experimental and practical training, program layout, technology-related disciplines, content composition, the AI era, and internationalization. These new terms illustrate the gradual expansion of the field in response to technological change and new demands on higher education.

Overall, the results from the four forms of keyword analysis complement one another. The co-occurrence network identifies major adjustment, major structure, talent cultivation plans, first-class academic majors, new engineering education, and new liberal arts as closely connected topics, indicating that a relatively stable research framework has emerged. The clustering results further organize these topics into distinct thematic groups. Burst detection highlights changes in scholarly attention, particularly the recent rise of new liberal arts and vocational undergraduate education, while industry–education integration, first-class academic majors, and featured academic majors have maintained considerable influence. Finally, the time-zone map demonstrates both continuity and change within the field: long-standing themes such as major construction and talent cultivation coexist with newly emerging topics shaped by current educational, technological, and social developments.

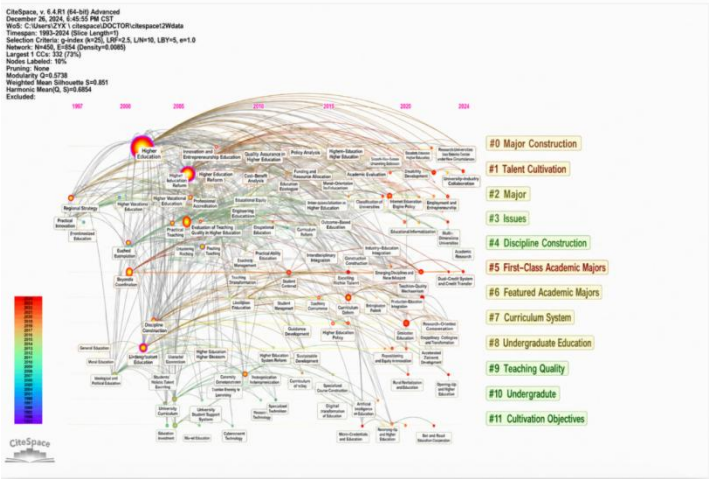

Figure 6. Keyword Time-Zone Map of Higher Education Major Research

4. Research Prospects

(1) Multidimensional Development Oriented Toward the Integration of Theory and Practice

As a key force in promoting development and innovation in the field of higher education, research on academic programs in higher education is grounded in the integration of theoretical interpretation and practical application, showing a clear practical orientation and distinctive developmental characteristics.

From the perspective of its practical foundation, research on academic programs in higher education has always been rooted in real issues in the field of higher education[xxvii][xxviii]. It represents a deep summary, refinement, and sublimation of practical work in higher education. The development of academic programs in higher education covers many aspects, including teaching reform, talent cultivation, discipline development, and management services. In these practical processes, various new situations and new problems continue to emerge, such as differences in talent cultivation orientation among higher education institutions at different levels, difficulties in promoting digital teaching models, and the relatively low efficiency of transforming university research achievements. Research on academic programs in higher education is closely rooted in the problems that emerge from educational practice. Much of the existing scholarship seeks to understand these problems and propose workable responses, giving the field a distinctly practical orientation. Such an orientation allows research to remain closely connected to changes in higher education and to address the needs arising from program development and reform.

Yet a practical orientation should not be understood as an exclusive emphasis on practice. Without an appropriate theoretical basis, practical inquiry may remain fragmented and confined to immediate problems, with limited capacity to explain their underlying causes. Theory detached from educational realities faces the opposite problem: although it may offer conceptual explanations, its relevance to actual educational settings can be limited. Therefore, the deep integration of theory and practice constitutes the core foundation of research on academic programs in higher education. Only by drawing on advanced educational theories, management theories, sociological theories, and other theoretical resources to construct a scientific analytical framework for practical research can higher education practice proceed in the right direction[xxix]. Practice, in turn, provides an important basis for examining whether existing theories remain applicable under changing conditions. Findings from practice may expose the limits of established explanations and create opportunities for their revision. In this sense, progress in the field depends on repeated movement between theoretical interpretation and empirical problems rather than on either dimension alone.

With the continuous improvement of the professional level of higher education disciplines and the increasing popularity of interdisciplinary research, research on academic programs in higher education has gradually achieved transformation and breakthrough. More and more researchers have begun to broaden their research horizons and approaches, paying attention to the use of classical theories to interpret practical issues in higher education[xxx]. Their analyses also operate at different levels. Educational communication theory, for instance, can be used to examine how information circulates within universities; organizational and management perspectives offer ways of understanding institutional governance; and theories of talent cultivation provide a basis for examining changes in educational models. The value of these approaches lies less in the simple application of established theories than in whether the chosen perspective can explain a concrete educational problem. When

theoretical analysis grows out of actual questions in higher education, research is more likely to achieve both explanatory depth and practical relevance.

From the perspective of future development, the trend toward integrating theoretical interpretation with practical application will become increasingly evident in research on academic programs in higher education. As the internal and external environments of higher education continue to change—for example, the deep integration of artificial intelligence technology and education[xxxi], and the challenges of higher education internationalization in the context of globalization[xxxii]—new practical issues will continue to emerge. Future studies will therefore need to engage more actively with theoretical work from related disciplines while remaining attentive to problems emerging from universities and academic programs themselves. New problems encountered in practice may become starting points for theoretical reconsideration, while new theoretical perspectives may offer different ways of interpreting and responding to those problems. Through this continuing interaction, research on academic programs can develop alongside the changing realities of higher education rather than remain detached from them.

(2) The Leading Role of New Liberal Arts and the Exploration of Vocational Undergraduate Programs

In the process by which higher education adapts to the development of the times and serves national strategic needs, research themes related to academic programs have always been closely connected with the direction of educational reform and the demands of social development[xxxiii]. Recent developments are particularly evident in two areas: new liberal arts and vocational undergraduate education. The former responds to changes in knowledge production, disciplinary integration, and talent cultivation, while the latter reflects the growing need for high-level technical and skilled professionals. Against the broader background of China's efforts to build a strong education system, both have moved from relatively new policy and educational practices into increasingly visible research topics. Their growing presence in the literature therefore reflects not only changes within academic program development itself, but also the way higher education is adjusting its structure and talent cultivation priorities in response to wider economic and social transformation.

The reconstruction and innovative practice of academic programs in higher education under the guidance of new liberal arts development have become sustained research hotspots. An examination of keyword trends in research on academic programs in higher education shows that the frequency of terms such as “new liberal arts” and “interdisciplinary integration” has increased year by year, and research content has gradually moved from conceptual interpretation to practical pathways. This indicates that new liberal arts have become a core lever for promoting the transformation of liberal arts programs in higher education and will remain a research focus at present and for some time to come[xxxiv]. Scholars have focused on issues such as how to break down disciplinary barriers among traditional liberal arts programs and realize interdisciplinary integration and reconstruction[xxxv]; how to strengthen cultural confidence and value guidance in program development[xxxvi], integrate fine traditional Chinese culture into curriculum content through curricular innovation, and cultivate

students' capacities for cultural inheritance and innovation; and how to enhance the social practice and service capacity of liberal arts programs and improve the social adaptability of program-based talent[xxxvii]. Existing research not only focuses on the macro-level adjustment of program structures, but also pays attention to micro-level innovation in curriculum systems and teaching models. It is committed to promoting the transformation of liberal arts programs from traditional forms toward innovative, interdisciplinary, and application-oriented forms.

Research on the establishment of vocational undergraduate programs and the construction of their talent cultivation systems has begun to generate a scale effect. As China's vocational education system extends from the junior college level to the undergraduate level, vocational undergraduate education, as a key link connecting higher education and vocational education, has seen a growing number of research outcomes on program development, forming clear research directions and practical cases. The focus of research lies in how to establish vocational undergraduate programs according to the needs of industrial upgrading[xxxviii]; how to integrate standards for vocational skill-level certificates into curriculum content and stimulate students' practical abilities through skills competitions[xxxix]; and how to deepen industry–education integration and school–enterprise cooperation[xl], such as by promoting deep enterprise participation in the formulation of talent cultivation plans and jointly building practical teaching bases, so as to solve problems including insufficient practical teaching resources and disconnection from industry in vocational undergraduate programs. It can be expected that future research on vocational undergraduate program development will become more refined, focusing on the creation of distinctive program features in different industries and the improvement of talent cultivation quality. It will become an important theoretical support for promoting the high-quality development of vocational undergraduate education.

(3) Emphasizing the Application of Diversified and Interdisciplinary Research Methods

Research methods provide the means through which questions concerning academic program development are identified, examined, and explained. Changes in methodology can also open up new ways of understanding established problems. For this reason, methodological development is closely related to the expansion of research in this field. When new methods are introduced, questions that were previously addressed mainly through conceptual discussion may be reconsidered from different perspectives and supported by new forms of evidence. This, in turn, can strengthen the empirical basis of research and provide more reliable evidence for academic program development in higher education.

A systematic review and analysis of literature related to academic program development in higher education shows that, in terms of research methods, existing studies have been constrained by the developmental stage of the discipline and the scope of research perspectives, and have mostly relied on speculative research. Researchers often conduct qualitative discussions of problems in higher education program development on the basis of their own experience and theoretical understanding, such as analyzing the disconnection between program establishment and social demand[xli], exploring structural deficiencies in curriculum systems, and proposing viewpoints and suggestions around these issues.

Such studies played an important role in identifying problems and developing initial explanations, particularly when systematic data were not readily available. Their limitations, however, are also evident. Conclusions drawn mainly from conceptual reasoning may be influenced by researchers' own judgments, while the lack of empirical evidence makes it difficult to determine whether findings from a particular context can be applied more broadly. Moreover, qualitative discussion alone is not always sufficient to reveal patterns in enrollment, curriculum provision, graduate employment, and other measurable aspects of academic program development.

With the continuous development of higher education, especially the ongoing refinement and differentiation of academic programs, research methods in the field of higher education program development have increasingly shown clear characteristics of diversification and interdisciplinary integration. In terms of methodological application, researchers now commonly emphasize the organic combination of quantitative and qualitative research. Through quantitative methods such as questionnaire surveys and statistical analysis, researchers collect relevant data on university program development and objectively analyze changes in indicators such as program enrollment scale, curriculum structure, and graduates' employment competitiveness[xlii]. Interviews and case studies address a different set of questions. They allow researchers to investigate why particular patterns occur and how universities, teachers, and students experience changes in academic programs. Quantitative and qualitative methods therefore serve different but complementary purposes. Rather than treating their combination as a simple methodological addition, current research increasingly uses different forms of evidence according to the nature of the research question. This methodological diversification has broadened the scope of inquiry and made the analysis of academic program development more closely connected with actual conditions in higher education.

The growing use of diverse and interdisciplinary methods reflects the increasing complexity of research on academic program development in higher education. These approaches enable researchers to examine specific issues from different perspectives and respond more effectively to emerging research questions. As the field continues to evolve, methodological diversity is likely to play a greater role in deepening research and providing a stronger basis for the development and improvement of academic programs.

5. Conclusion

This study uses the CiteSpace knowledge mapping tool to conduct a visual analysis of the research progress on academic program development in China's higher education. It carries out knowledge mapping analysis from the perspectives of research trajectory, including temporal and spatial distribution characteristics and highly cited literature, as well as research hotspots and hotspot themes, including keyword co-occurrence, keyword bursts, and keyword time zones. It discusses the progress, hotspots, and trends of this research field. By using quantitative methods to organize and analyze existing literature, the study makes its findings more objective. At the same time, the presentation of

various charts makes the research results more vivid, intuitive, and clear at a glance. However, considering the non-static nature of literature retrieval and the tool-based limitations of software, future research should combine qualitative analysis with quantitative analysis, strengthen qualitative analysis on the basis of quantitative analysis, and use diversified research methods to present a more specific, objective, and comprehensive picture of research on higher education program development.

6. Reference

[i] The Editorial Office of Educational Research.The 2023 Annual Report on Cutting-Edge andHot Issues Involving Educational Research in China[J].Educational Research,2024,45(02):79-94.

[ii] Zhu Xin.Reflections on Undergraduate Teaching Quality Assurance in Universities: From Institution to Culture[J].Higher Education Exploration.2015,(07):73-77.

[iii] Liu Fuxing,Wang Shuqin.Improving Talent Competitiveness in the Development of China into a Leading Country in Education[J].Educational Research,2025,46(09):16-28.

[iv] Yong-tang,LIXin.The Spatial Production Mechanism of Underdeveloped Regions in Higher Education and Their Governance Direction[J].Journal of Higher Education.2025,46(01):19-30.

[v] Liang Yucheng,Zhang Shuochen.A Study on the Restructuring of Discipline Layout in China's Higher Education in the Era of Digital-Intelligent Transformation[J].Youth Exploration,2024,(06):55-68.

[vi] Liu Haitao. Research on the Power Inspection and Coordination Mechanism Construction of Multiple-subject Participation in Undergraduate Majors Setting[J]. Heilongjiang Researches on Higher Education,2022,40(08):40-46.

[vii] Yan Guangcai.The Evolution and Development Directions of Undergraduate Major Education[J].Journal of Higher Education,2024,45(04):58-67.

[viii] Feng Yong, Zhong Jiang, Wang Qian, Li Xueming.Research and Practice in Co-intelligence Integrated Collaborative Innovation Training of Big Data Intelligent Personnel[J].China Educational Technology,2021,(04):16-25.

[ix] Wu Zhongjiang, Huang Chengliang. Accelerate the development of a talent training system that gives equal priority to academic degrees and professional degrees[J].China Higher Education,2013,(01):52-54.

[x] Zhao Jinmin, Zhou Wenhui.How does the M.Ed. Degree in American Higher Education Train University Administrators[J].China Higher Education Research,2024,(04):93-101.

[xi] Xu Jie', Hu Huiyuan. The Knowledge Graph Analysis of Interdisciplinary Talent Cultivation Research inChina Based on CiteSpace[J]. Science and Technology Management Research,2025,45(06):11-18.

[xii] Yang Jinchun. Integrating "Service" and "Reliance" for the Coordinated Development of Education and Economy — Reflections on the Development and Reform of the "Urban Construction"

Major in Adult Higher Education[J].China Higher Education,1992,(06):41-42.

[xiii] Zuo Tieyong. Implement a scientific and standardized catalogue of disciplines and specialties to promote discipline development and talent cultivation[J].Academic Degrees & Graduate Education,1997,(05):3-4.

[xiv] Li Guoxiang, Zhang Xinming.On the Reform Ideas for the Major Construction of Audio-Visual Education in Normal Universities[J].e-Education Research,1998,(01):16-19.

[xv] Feng Xiang-dong. Discipline,specialty construction and talents cultivation[J]. Journal of Higher Education,2002,(03):67-71.

[xvi] Wang Jianhua. On the Correlation Between Discipline, Curriculum and Major Construction[J].Academic Degrees & Graduate Education,2004,(01):21-24.

[xvii] Huang Zihua, Ye Zhiming. Scientific and Standardized Independent Setup and Adjustment of Disciplines and Majors[J].China University Teaching, 2005,(04):37-38.

[xviii] Qiu Xiaojie, Zhang Ximei. A Study on Regional Economy and the Orientation of Major Construction in Local Universities[J].China Adult Education,2008,(09):24-25.

[xix] Fu Weili, Liu Jinghua. Basic Relationships Be Handled Well in Professional Adjustment and Construction in Universities[J].Education Science,2014,30(06):65-68.

[xx] Liu Haitao. Analysis of the Undergraduate Major Quality Construction[J].Heilongjiang Researches on Higher Education,2018,36(04):28-30.

[xxi] Wang Jianhua. Thoughts on the Construction of Top Undergraduate Major:Comments on“Double Ten-Thousand Plan[J].Chongqing Higher Education Research,2019,7(04):122-128.

[xxii] Wu Zhengyang, Guohui. The realistic status, practical logic and optimization path of structural adjustment of undergraduate majors in China:analysis based on the action plan of undergraduate majors adjustment in ordinary universities from 2014 to 2024[J].Journal of Higher Education Management,2025,19(02):101-112.

[xxiii] Zong Xiaoping. Evaluation of core authors based on Price law and the comprehensive index method: a case study of Chinese Journal of Scientific and Technical Periodicals[J].Chinese Journal of Scientific and Technical Periodicals,2016,27(12):1310-1314.

[xxiv] Li Jie, Chen Chaomei. CiteSpace: Text Mining and Visualization in Scientific Literature (Third Edition)[M]. Beijing: Capital University of Economics and Business Press, 2022,105,137.

[xxv] Tan Chong, Zhang Yihui. A Bibliometric Analysis of Research on “University Student Organisations” in China[J]. China Youth Study, 2010, (06): 90-95.

[xxvi] Fu Ying, Su Hailong, Li Xianbo. A Bibliometric Analysis and Knowledge Graph of Research Integrity and Ethical Governance: An Analysis Using CiteSpace[J]. Social Scientist, 2025, (04): 185-190.

[xxvii] Xu Xun, Luo Xiao, Zhang Wanpeng. The “space of flow” of higher education in the post-epidemic era and its governance strategies: from the perspective of governing by network[J].

Journal of Higher Education Management, 2021, 15(06): 79-90.

[xxviii] Li Haifen, Xue Tianxiang. Research in Higher Education and Research Methodology in Education[J]. Jiangsu Higher Education, 2004, (03): 11-13.

[xxix] Chu Zhaofeng, Chen Tinzhu, Li Mingzhong. A Multidimensional Analysis of the Current State of Academic Paper Production in the Field of Higher Education Studies: A C100 Index Perspective[J]. Higher Education Exploration, 2017, (09): 5-13.

[xxx] Chen Fangfang, Chen Yupei. Research on the Construction of Emerging Professional Course Groups from the Perspective of Interdisciplinary Integration[J]. Theory and Practice of Education, 2025, 45(30): 51-55.

[xxxi] Gong Lingling, LI Baomin. The Global Landscape and Direction of AI in Education:An International Policy Analysis Based on Strategic Maps[J]. Journal of Comparative Education, 2025, (06): 157-172.

[xxxii] Duan Shifei. International Experience and Local Actions in the Digital Transformation of Higher Education Internationalization[J]. Journal of Guizhou Normal University(Social Sciences Edition), 2024, (04): 107-118.

[xxxiii] Liu Xiaobin, Guo Mingshun. Reform of the University Admissions System: China's Challenges and the US Experience[J]. Higher Agricultural Education, 2013, (05): 121-123.

[xxxiv] Li Yanfeng. On the Essence and Pathways of Developing the New Liberal Arts[J]. University, 2022, (34): 43-46.

[xxxv] Huang Kainan, Miao Zikun. A Bibliometric Analysis on the Research Progress of New Liberal Arts[J]. Journal of Shandong University(Philosophy and Social Sciences), 2021, (06): 162-171.

[xxxvi] Zhang Xiqian. Guiding the high-quality development of university physical education major through the educators' spirit[J]. Journal of Physical Education, 2025, 32(03): 121-128.

[xxxvii] Liu Yang, Jiang Yiyin. A Study on Innovation in Practical Teaching Models for Humanities Programs in Higher Education Institutions[J]. Teaching and Nurturing Students (Higher Education Forum), 2016, (33): 101-105.

[xxxviii] Song Ya Feng, Zhao Kangjian. A Study on the Alignment between the Programme Structure of Vocational Bachelor's Degree Institutions and Regional Industrial Structures[J]. Higher Education Exploration, 2025, (05): 99-106.

[xxxix] Wang Xin, Jin Hongmei. The Theoretical Foundations, Intrinsic Requirements and Implementation Pathways of an Integrated "Work-Placement, Curriculum, Competitions and Qualifications" Approach to Vocational Education Based on a Broad Perspective on Vocational Education[J]. Education and Vocation, 2022, (02): 21-28.

[xl] Song Liqiu, Qi Hongxue. Innovation in Talent Cultivation Models at Application-Oriented Universities from the Perspective of Industry-Education Integration[J]. Journal of Shanxi University of Finance and Economics, 2025, 47(S2): 208-210.

[xli] Zhao Chunsen.What Has “University Enrolment Expansion” Brought About? — A Discussion Based on the Principles of Education[J]. Educator, 2009, (S5): 5-6.

[xlii] Wang Licheng, Zong Xiaohua. Major Choice and Future Earnings: Empirical Study Based on China Family Panel Studies Data[J]. China Economics of Education Review, 2024, 9(05): 47-67.