Research Hotspots and Progress of Specialty Construction in China Based on CiteSpace and SPSS Quantitative Analysis

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Abstract. Specialty is the basic teaching in colleges and universities to highlight the characteristics of education, improve the quality of teaching, optimize the structure of specialty, and enhance the level of the University. Using the visualization tool of knowledge map, we found that: the core network of specialty research in China has not yet formed. At present, the research mainly focuses on the connotation development of specialty construction, the integration of industry and education, the construction of vocational education curriculum and the construction of characteristic specialties, showing the research characteristics of "three stages and two directions". We should further encourage undergraduate colleges and universities to attach importance to the theoretical research of specialty construction, promote the research of characteristic specialties construction under the collaborative background, and better play the leading edge and diversification of scientific research knowledge.

Keywords: Specialty Construction, Citespace, Knowledge Map

1. Data and Research Methods
In this study, "CSSCI" database and China core database in CNKI are used as the research data. Because these two databases collect the most advanced and important research results in each period, they become the most important two databases in the field of literature quantitative research with their authority and frontier. The first step is to search for key words with "specialty construction" as the key word. Finally, 874 literatures with the key word "specialty construction" are selected; in the second step, the conference information, conference review, book review, film review, character introduction, news information and other non research literature were screened out by manual screening, and finally 862 documents were selected as the data of this study. The following will focus on the theme and characteristics of specialty construction from multiple perspectives.

2. Results and Analysis

2.1. Research Hotspots in the Field of Specialty Construction in China
The key words of specialty construction are analyzed by SPSS, and the linear fitting scatter diagram of key words in the field of specialty construction is obtained. The centrality and density of topics in the
first quadrant are both large, which is in the center of the research field; the centripetal degree and density of the second quadrant are relatively small, but the density is large, which indicates that the topic structure is relatively complete, but the centrality of the research is not prominent, so it has a potential development momentum; the third quadrant has a smaller theme density and centripetal degree, the research heat is low and the research team is not mature; the fourth quadrant is characterized by low topic density and immature research team The centripetal degree of the topic is larger and the density is smaller, which indicates that the importance of the topic is low, but the internal structure is relatively complete, and there are continuous research teams to participate in the research of this topic.

The first research hotspot is the research on connotation development of specialty construction. The key words focused on the first quadrant reflect the connotation development of specialty construction. From the perspective of the connotation development of colleges and universities, it is mainly manifested in the enhancement of connotation elements such as specialty, curriculum, teaching staff and teaching environment. The research of this kind of subject is in the central position in this field. The themes of this quadrant mainly focus on the coordinated development of subject construction and specialty construction, and the coordinated development of specialty construction and curriculum construction.

The second research hotspot is integration of production and education and curriculum construction of Vocational Education. Under the background of the third quadrant, the construction of vocational education focuses on the integration of production and teaching. Under the background of the integration of production and education, vocational education curriculum construction should take social practice as the clue, arrange the curriculum according to the nature of work, and construct a reasonable curriculum system. The curriculum should reflect the practical characteristics and help production practice [1]. The centrality and density of this kind of subject research are small, the research structure is loose, and there is no mature research team, let alone new research team injection, which is also in the marginal position in this research field.

The third research hotspot is characteristic specialty construction. Although characteristic specialty construction is a hot topic, the research team of characteristic specialty construction is not mature, and new research force can not be continuously injected into this field. The reason for this research trend is that "characteristics determine survival". In 2019, the implementation of the "double high education program" has injected new vitality into the construction of characteristic specialty in higher vocational colleges, and also stimulated the enthusiasm of scholars for the construction of characteristic specialties. However, as a hot topic in the field of higher education for a long time, the construction of characteristic specialty urgently needs to produce new research direction and stimulate the enthusiasm of scholars, otherwise it is difficult to attract more researchers to join.

2.2. Research Level of Literature
In CNKI, the research level of specialty construction research field can be roughly divided into seven categories, among which basic research (social science) has the largest number, with 318, followed by higher education, with 297, followed by industry guidance (social science), basic and applied basic research (nature) 34, engineering technology (nature) 21, industry technical guidance (nature) category There were 16 references and 16 articles on vocational guidance (social science). From the number of literatures published on HowNet, we can find that: first, the number of papers published by NSFC is more than that supported by NSFC; second, the number of basic research papers published is more than that of policy, industry, occupation or engineering technology.

2.3. Research Level of Literature
Specialty is the product of social and economic development. According to the high-frequency keywords of social and economic development stage and specialty construction research field, the research field of specialty construction is divided into three stages: 1999-2005 initial stage; 2006-2011 vigorous development stage; 2012-2019 deepening stage.
The first stage is the initial stage of specialty construction (1999-2005): vocational education curriculum construction. The main link of specialty construction in vocational colleges is specialty planning and development, and curriculum system is designed and adjusted according to talent training objectives [2]. In addition, the specialty construction of vocational education is not a castle in the air, but to meet the needs of the society, and set up the curriculum system according to the characteristics of the school [3].

The second stage is the vigorous development stage of specialty construction (2006-2011): talent training mode reform. The training mode of vocational colleges should be based on school enterprise cooperation and the core is the combination of work and study [4]. Summarize the successful experience in the process of personnel training in our university, and give full play to the experience advantage in this process [5].

The third stage is the deepening stage of specialty construction (2012-2014): Research on the new trend of specialty construction. It is reflected in two directions: new engineering construction and professional certification. This paper studies the internal law of new engineering specialty construction, and explores its connotation and approach [6]. Different types of colleges and universities have different construction goals and paths of new engineering [7]. We should promote the specialty construction by professional certification, and reform the training mode, curriculum content and teaching supervision [8]. The concept of professional certification should also be introduced into the field of vocational education to build a professional certification system with vocational education characteristics [9].

2.4. The Frontier Analysis of Specialty Construction Research in China
The emergence word is the symbol of the frontier research in a certain field. Emergent words refer to the academic words which increase suddenly in different research stages. Generally speaking, in a certain research field, the high-frequency keywords in each stage are its emergence words [10]. CiteSpace, as a tool for econometric research, is a common software for emergent word analysis. With the help of this software, this paper analyzes the top 20 prominent words in the field of specialty construction research in China.

The emergence words of CiteSpace indicate that some influential events happened in a certain field within a period of time, thus forming the topic focus of some keywords. At present, the research hotspots in the field of specialty construction are "new engineering", "professional certification", "integration of production and education", "talent training", "industrial transformation and upgrading", "Vocational Education" and other hot words. From 1999 to 2008, "training objectives" and "curriculum setting" are hot topics in research, "educational technology", "higher vocational colleges", "characteristic specialty", "talent training mode", "discipline construction", "educational technology", "Higher Vocational and technical education", "information management", "higher vocational education", "information management and information system". From 2000 to 2012, it is a hot topic of intermittent. "Action plan" and "sports colleges" are hot topics in 2016 and 2017 respectively. Among them, "training objectives" and "Curriculum" are hot topics with the longest duration so far. Based on the homogeneous classification method and hot spot duration, the five frontier hot words were divided into two groups.

"New engineering", "professional certification" and "talent training" are closely linked, so they are discussed together as a research topic. Professional certification, new engineering and talent training as research hotspots started in 2014, 2017 and 2018 respectively, until the deadline of literature collection on December 31, 2019, and the topic still remains hot. China's professional certification is initiated in the field of engineering education, and it is also the most mature professional certification research field so far. The construction of new engineering courses is the upgraded version of engineering education reform. It should be deeply integrated into the construction of new engineering courses, which also provides the basis for the formulation of talent evaluation mode, and is also the catalyst for the remodeling of talent quality structure [11]. The new engineering course divides the talent cultivation into three stages. In the early stage, it pays attention to the cultivation of enrollment
and general education; in the middle stage, it pays attention to the professional diversion and professional education; in the later stage, it pays attention to the diversified development [12]. In June 2013, China officially joined the Washington Agreement, which is a stepping stone for engineering students to go to the world and become international talents. Since then, it has become a research frontier topic since 2014. Since February 2017, the Ministry of education has actively promoted the construction of new engineering courses, and issued a series of policies, so the research on new engineering courses has been paid more and more attention. "New engineering construction" and "professional certification" are both effective ways to reform talent training mode. "New engineering construction", "professional certification" and "personnel training" are closely linked, and they are also the research hotspots since 2014. Therefore, these three topics are not only hot topics, but also frontier topics, which are closely related to the background of social and economic development. It can be seen that "new engineering", "professional certification" and "personnel training" will continue to maintain a high degree of research in the future, and become the research core and research frontier.

The three key words of "Vocational Education", "industrial transformation and upgrading" and "integration of industry and education" are closely related in theory. The author discusses them as the same research topic. As the current frontier topics, industrial transformation and upgrading and vocational education started in 2015, 2016 and 2018 respectively, and the research is still in a high degree. Vocational education is closely related to the transformation of industrial structure [13]. The integration of production and education restricts the development of vocational education. Vocational education also divides the process into stages and defines tasks [14]. In 2014, the promulgation of "decision on accelerating the development of modern vocational education" marks the development of industry education integration to a new stage. Since then, the integration of industry and education has become a frontier topic in this field. In 2015, with the release of "made in China 2025", manufacturing industry ushered in the spring of industrial structure transformation and upgrading. In the field of education, vocational education promotes industrial transformation and upgrading through professional connotation construction. The release and implementation of the national vocational education reform implementation plan in 2018 once again affirmed the prominent position of vocational education, and the research on specialty construction around vocational education increased year by year. "Integration of production and education" and "Vocational Education" are also hot topics in this field, so this research topic is not only a hot topic, but also a frontier topic. Therefore, the research in this field will continue to maintain its research enthusiasm.

3. Conclusion and Prospect

By combing the research results in the field of professional construction in China, combined with the research hotspots and research paths in this field, it is concluded that the research problems and Countermeasures in the field of professional construction focus on the following three aspects:

3.1. Research on Encouraging Undergraduate Colleges to Attach Importance to Specialty Construction

Based on the knowledge map research of CiteSpace's research institutions and authors, we can find that the publishing institutions are concentrated in Vocational and technical colleges. However, there are few related researches on specialty construction in ordinary undergraduate schools, but the research on discipline construction in ordinary undergraduate schools is particularly important, which will lead to the dilemma that some universities attach importance to scientific research and neglect teaching. Therefore, undergraduate colleges and universities should correctly deal with the internal relationship between discipline construction and specialty construction. They should be integrated, supported and supported each other, and should not be separated. In addition, the situation of neglecting major but emphasizing discipline in undergraduate colleges should be broken. We should formulate perfect relevant policies, reasonable evaluation mechanism and scientific use of various incentive means to transfer the achievements of discipline construction to students imperceptibly and promote the connotative development of specialty [15].
3.2. Research on Characteristic Specialty Construction under the Background of Promoting Cooperation

Curriculum teaching is the core content of teaching and is an important means in the process of personnel training, also the substantive content of professional construction. In dealing with the relationship between professional construction and curriculum construction of Vocational Education under the background of integration of production and education, firstly, the curriculum of vocational education should be based on the needs of social and economic development, and then the curriculum content required by the major should be introduced; secondly, the curriculum of vocational education should conform to the education law of work study combination of vocational education, reflecting the needs of teaching content and post ability Thirdly, the planning and setting of courses meet the needs of professional construction; finally, taking the construction of excellent courses as the leader, we can improve the overall quality of courses and achieve the purpose of improving the level of professional construction [16]. The research on characteristic specialty construction should be the pioneer and guide of the first-class specialty construction. For the research in this field, we should encourage the research team to join in, adopt incentive means such as scientific research reward to enhance the enthusiasm of new forces, optimize the research structure of specialty construction, form a wide field and multi-level structure, and develop cross field and cross level research.

3.3. Give Full Play to the Leading Edge and Diversity of Scientific Research Knowledge

From the perspective of research frontier, the frontier topics in recent years are all around the national education policy and social hot topics. Although the research of frontier topics can promote the development of research in this field, the blind spot of research can still promote the deepening of research in this field and enhance the theoretical research height in this field. The deepening of theoretical research has always been the pursuit goal of scholars. Therefore, while studying the frontier topics, we should also pay attention to the problem of blind spots, and constantly improve the research height and depth in this field. In recent years, the blind spot topic mainly focuses on the research of vocational education talent training mode. Some opinions on comprehensively improving the teaching quality of Higher Vocational Education proposed by the Ministry of education, Higher vocational colleges should take the combination of work and study as the breakthrough point of talent training mode reform, and take it as the key consideration factor of specialty construction and specialty adjustment. The establishment of the talent training mode of work study combination has become an important breakthrough in the specialty construction of higher vocational colleges, so the research on talent training mode of vocational education is very important. The research of talent training mode and specialty construction complement each other and promote each other. At the same time, we should promote the establishment and reform of curriculum system with theory as the guide and talent training as the goal [17].

References
[1] Liu Zhongbin, Cheng Lu, Li Lingna. Curriculum system construction based on the background of industry education integration [J]. Occupation, 2018 (24): 77-78. (in Chinese).
[2] Tang Guoqing. Preliminary study on specialty construction of Higher Vocational Education [J]. China Vocational and technical education, 2005 (10): 43-47. (in Chinese).
[3] Li Jianqiu. On specialty construction in Higher Vocational Colleges [J]. On Higher Vocational Education, 2003(04):75-79. (in Chinese).
[4] Zhang denghong. On the reform of talent training mode of "school enterprise cooperation and work study combination" in Higher Vocational Education [J]. Education and occupation, 2011 (33): 27-28. (in Chinese).
[5] Gao Chengming, Huang hangjuan. Construction of talent training mode platform of work integrated learning in comprehensive art colleges [J]. Journal of Zhejiang Art Vocational College, 2011, 9 (04): 59-64. (in Chinese).
[6] Li Zhengliang, Liao Ruijin, Dong Lingyan. New engineering specialty construction:
[6] connotation, path and training mode [J]. Higher engineering education research, 2018 (02): 20-24 + 51. (in Chinese).

[7] Lin Jian. China's new engineering construction facing the future [J]. Educational research of Tsinghua University, 2017, 38 (02): 26-35. (in Chinese).

[8] Sun Huanwu, Zhang Cheng. Practice of Engineering Specialty Construction in Local Universities Based on the concept of engineering education professional certification [J]. Teaching in China University, 2017 (11): 39-42 + 53. (in Chinese).

[9] Chen Xiaomeng, Zhou Zhigang, Yan Zhiyong. Difficulties and Strategies of specialty construction in Higher Vocational Education from the perspective of professional certification [J]. Vocational Education Forum, 2014 (33): 65-69. (in Chinese).

[10] Fang Shuai. Research hotspots and evolution trend of deliberative democracy in China -- visual analysis based on CiteSpace software [J / OL]. Learning forum, 2020 (02): 1-7 [2020-03-21] https://doi.org/10.16133/j.cnki.xxlt.2020.02.019. (in Chinese).

[11] Zhang Rui, Du Zhenyu. Promotion strategy of engineering education professional certification (evaluation) - based on the data analysis of Engineering Education Accreditation (evaluation) specialty from 1992 to 2018 [J]. China University Science and technology, 2019 (05): 34-37. (in Chinese).

[12] Zhang Haisheng, Zhang Yu. Practical problems and development strategies of interdisciplinary integration of new engineering talents cultivation [J]. Chongqing higher education research, 2019, 7 (06): 81-93. (in Chinese).

[13] Wu Qingsong. Research on the innovation and development of vocational education from the perspective of industrial transformation and upgrading [J]. Continuing education research, 2017 (04): 68-73. (in Chinese).

[14] Wang Huan. Professional construction mode of integration of production and education in Vocational Education: theoretical basis and stage division [J]. China Vocational and technical education, 2019 (23): 52-58. (in Chinese).

[15] Yuan Guanglin. On discipline construction and specialty construction in public security universities [J]. Journal of people's Public Security University of China (social science edition), 2017, 33 (02): 122-127. (in Chinese).

[16] Liu Xiao, Shi Weiping. On connotation construction of Higher Vocational Colleges: from curriculum construction to specialty construction [J]. Journal of Hebei Normal University (education science edition), 2011, 13 (11): 89-92. (in Chinese).

[17] Zhang Yinghong. Practice the combination of work and study, and innovate the talent training mode of "working together and learning together" [J]. China Adult Education, 2011 (18): 92-94. (in Chinese).