



Research Hotspot and Prospect of Application-Oriented Undergraduate Personnel Training——Visualization Map Analysis Based on 2018–2022 CNKI Database

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Abstract. In order to clarify the research and development status of application-oriented undergraduate personnel training, the research hotspot and development context in this field are analyzed. In this paper, 3270 literatures published in the CNKI database from 2018 to 2022 were retrieved, and the knowledge graph visualization analysis was carried out on the retrieved literatures by Bicomb, Ucinet and SPSS. It is found that the research focus of application-oriented undergraduate personnel training is mainly in the following three aspects: the program and mode of application-oriented undergraduate personnel training; Application-oriented undergraduate curriculum construction; Applied undergraduate teaching reform; Applied undergraduate practice teaching. This paper summarizes the current research status, and concludes the research fields that should be paid attention to in the future.

Keywords: Applied undergraduate · Personnel training · Knowledge graph · Visual analysis

1 Introduction

In the new period of popularization of higher education, applied undergraduate plays an important role in our higher education system, which has become an important force in our higher education construction. By using Bicomb, Ucinet and SPSS software, this study conducted an intuitive quantitative analysis and commonality analysis on the journal literatures published in CNKI database from 2018 to 2022, so as to provide reference for promoting the improvement and development of research theories in the field of applied undergraduate personnel training.

2 Research Methods

2.1 Data Source

An advanced search was conducted on the database of CNKI with the theme of “Training of applied undergraduate talents” and the time was adjusted to 2018 to 2022. Social Sciences II was selected as the literature classification catalog and all journals were

selected as source journals. A total of 3535 results were searched. Excluding the contents unrelated to this study, such as celebrity interviews, journal recruitment, guest reviews and advertisements, 3,270 results were selected as the object of this study.

2.2 Research Tools and Methods

In this study, 3270 valid articles derived from China National Knowledge Network database were selected as research objects, and Bicomb, Ucinet and SPSS were selected for research and analysis. Specific research steps and software use are as follows:

1. Conduct journal article retrieval in the database of CNKI, and export the literature data that meet the conditions, such as title, author, unit, journal, abstract, keywords and time. Select NoteFirst format to export the document.
2. The literature data was imported into the Bicomb software, and the keywords were standardized, and the synonyms were transformed and modified. For example, the keywords “application-oriented undergraduate”, “application-oriented undergraduate university” and “application-oriented undergraduate university” are synonyms, so they can be generally adjusted to “application-oriented undergraduate” for analysis and statistics.
3. Use Ucinet and SPSS to conduct co-word analysis and cluster analysis for high-frequency keywords in research literature. Co-word analysis is to judge hot topics and the relationship between hot topics by the occurrence frequency of keywords in the research literature. Cluster analysis is the classification of keywords in research literature, so as to further judge the internal relationship between research topics and the interrelationship between other topics, and on this basis, further analyze the status quo, hot spots and development trends. The specific approach is to import the keyword discourse matrix generated in Bicomb into SPSS for systematic clustering analysis; The keyword co-occurrence matrix generated in Bicomb was imported into Ucinet for network analysis.

3 Research Status and Hot Spots Analysis

3.1 High-Frequency Keywords

3.1.1 High-Frequency Keyword Frequency

The key words in the research literature were classified and screened by Bicomb software to extract effective topic keywords. Then, the statistical function of Bicomb was utilized to identify the top 10 high-frequency keywords as the main research objects, it can be seen that the research on the training of application-oriented undergraduate talents is mainly carried out around the core keyword of “application-oriented undergraduate”, which mainly focuses on the training of application-oriented talents and the mode and plan of the training of research talents. “Practical teaching”, “teaching reform”, “innovation and entrepreneurship education”, “school-enterprise cooperation” and “curriculum system” are the hot spots in the current research and discussion of application-oriented undergraduate talent training, and also the concentrated problem areas to be solved urgently.

3.1.2 High Frequency Keywords Social Network

In order to explore the relationship between research hotspots in application-oriented undergraduate talent cultivation, Bicomb literature co-occurrence analysis system and Ucinet software were used to draw a social network of high-frequency keywords. Bicomb software was used to construct the co-occurrence matrix of the top 10 high-frequency keywords, the size of which was 10×10 (see Table 1). The value in the matrix refers to the frequency of the pair of keywords appearing at the same time. The larger the frequency value, the closer the connection between the keywords. After that, the values of the matrix are imported into Ucinet for further processing, and the overall index of applied undergraduate talent cultivation keywords can be obtained through Ucinet.

Using NetDraw of Ucinet to draw the keyword social network: selecting the centrality of “degree” as the condition for the centrality calculation and analysis of the drawn high-frequency keyword social network, the high-frequency keyword social network is obtained. In addition to the two search keywords of “applied undergraduate” and “talent cultivation”, “applied talents” has become the research core of applied undergraduate talent cultivation, which is in the center of the social network graph. “Practice teaching”, “curriculum system”, “innovation and entrepreneurship education”, “talent training mode and program”, “school-enterprise cooperation” and “teaching reform” are in the middle of the social network graph. They are the hubs that connect core topics and marginal topics, reflect the current foothold of application-oriented undergraduate talent training, and mean the future research trend and direction. On the other hand, the key words “professional construction”, “integration of industry and education”, “private universities” and so on, which are located in the periphery of the network, represent some marginal researches in the field of applied undergraduate talent cultivation, which are subject areas that need further research and discussion by scholars.

In conclusion, combined with the word frequency analysis of Bicomb software and the social network analysis of Ucinet software, this study puts forward the following

Table 1. Co-occurrence matrix of high-frequency keywords

variable	1	2	3	4	5	6	7	8	9	10
1.Applied undergraduate	190	46	13	17	21	13	10	10	8	6
2.Personnel training	46	111	9	0	7	5	6	11	8	0
3.Applied talents	13	9	84	5	1	5	3	5	3	2
4.Talent training mode	17	0	5	45	1	2	2	1	2	0
5.Practical teaching	21	7	1	1	30	1	1	1	0	1
6.Teaching reform	13	5	5	2	1	30	1	1	1	0
7.Innovation and entrepreneurship education	10	6	3	2	1	1	28	2	2	1
8.School-enterprise cooperation	10	11	5	1	1	1	2	27	0	1
9.Curriculum system	8	8	3	2	1	1	2	0	22	1
10.Talent training program	6	0	2	0	1	0	1	1	1	14

research hotspots for application-oriented undergraduate talents cultivation: connotation of application-oriented talents; Applied undergraduate practice teaching; Applied undergraduate teaching reform; Application-oriented undergraduate curriculum construction; Application-oriented undergraduate personnel training program and mode; Application-oriented undergraduate cooperation between universities and enterprises.

3.2 Hot Spot Analysis

3.2.1 Application - Type Undergraduate Talent Training Program and Mode

The biggest difference between applied undergraduate and ordinary undergraduate lies in the type and specification of personnel training. Scholars have reached a consensus on the training target type of applied talents, namely, applied talents. Therefore, the focus of application-oriented undergraduate personnel training mainly focuses on the training program and training mode. In terms of training programs, Jiang Yulin proposed that application-oriented undergraduate talent training programs should be market-oriented, with clear professional training objectives and business scope [1]. With ability training as the focus, the construction of professional curriculum system; With quality education as the core, the characteristics of application-oriented personnel training will be formed. Weng Weibin proposed that the talent training program should follow the idea of “multi-theme participation, backward method and integrated design” [2]. To be specific, it is necessary to work with related industries, similar universities and graduate students to determine the business specification requirements of talents needed by the industry, and then “backward” according to the specification requirements to determine the target positioning of talent training and various abilities that graduates should have. Finally, the survey results are implemented in the configuration of the curriculum, and attention should be paid to the consistency of teaching and evaluation. In terms of talent training mode, due to the different regions and advantageous disciplines of different application-oriented undergraduate, different majors have different requirements for talents, so the research on talent training mode is mostly based on different majors or disciplines.

3.2.2 Application-Oriented Undergraduate Curriculum Construction

Application-oriented undergraduate is different from traditional undergraduate, and its differences are mainly reflected in curriculum construction. However, from the perspective of the existing courses of most application-oriented undergraduates, the curriculum arrangement is basically modeled on that of research universities. There is a considerable gap between the curriculum arrangement and the practical ability required by the students in the future work. Therefore, only by constructing the curriculum system with the characteristics of application-oriented undergraduate, can qualified application-oriented talents be cultivated. Wang Luying proposed that “ability standard” should replace “subject standard” as the main value orientation of curriculum system [3]. The so-called competency-based curriculum means that in addition to the traditional theoretical curriculum, it also includes all practical teaching links and organized extracurricular activities and social practice activities related to the training objectives. Xu Liqing proposed that school curriculum must strengthen three mechanisms, one is curriculum

access demonstration mechanism, the second is curriculum information disclosure mechanism, the third is curriculum quality evaluation mechanism [4]. Application-oriented undergraduate talents mainly enter enterprises directly after graduation, so it is very necessary for course content to keep up with industry trends, technological progress and market demand.

3.2.3 Applied Undergraduate Teaching Reform

According to the secondary literature search, teaching reform mainly focuses on teaching plan, teaching content and teaching evaluation. First of all, in the teaching plan. According to the national educational policies and guidelines, application-oriented undergraduate colleges should carry out top-level design according to the personnel training system, determine the major training objectives and personnel training direction, and rationally optimize the arrangement of class hours and credit allocation. Secondly, in terms of teaching content. On the basis of following the knowledge system, the teaching of application-oriented undergraduate students should reflect the characteristics of emphasizing ability, emphasize the compatibility of course content and students' future employment, and restructure and design the teaching content according to the needs of actual work tasks, so that the teaching content can meet the professional standards and meet the requirements of enterprises. Finally, in the teaching quality evaluation. Application-oriented undergraduate colleges should formulate a perfect evaluation standard system according to their own educational orientation, superior disciplines, personnel training mode and geographical location, combined with the specific conditions of main teaching links. In this way, the school can also make its own characteristics, and gradually improve the current undergraduate school "one thousand schools" realistic dilemma.

3.2.4 Applied Undergraduate Practice Teaching

At present, practical teaching for application-oriented undergraduate students is Mired in many difficulties. For example, Si Shumei believes that practical teaching is dependent on theoretical teaching, which leads teachers to adopt the thinking mode of theoretical teaching in practical teaching [5]. In the process of training students' thinking mode, different characteristics of theoretical teaching and practical teaching are ignored. Mo Huilin et al. believe that there are problems in the construction of the curriculum connotation of practical teaching, which are shown in the first place: outdated teaching content, backward teaching means and technology, which cannot meet the standard requirements of the society for applied talents; Second, due to the lack of a set of practical teaching evaluation index system suitable for application-oriented undergraduates, the evaluation of practical teaching has a certain degree of randomness [6]. Some scholars also put forward their own views on solving the problems existing in the practical teaching of applied undergraduate students. For example, Liu Kekuan pointed out that practical teaching should form new operating mechanisms, such as teaching process management mechanism, teaching resource investment mechanism, teaching operation guarantee mechanism, teaching link incentive mechanism and teaching quality monitoring mechanism [7].

4 Thoughts and Suggestions

4.1 Strengthen Detailed Research on the Professional Specifications of Application-Oriented Undergraduate Personnel Training

The specifications of application-oriented undergraduate personnel training include basic specifications and professional specifications. Basic specifications refer to the basic requirements for application-oriented undergraduate talents, which are put forward for all training objects of application-oriented undergraduate. Professional specifications refer to the professional requirements of students in terms of knowledge, ability and professional quality needed to adapt to future specific jobs. In terms of basic specifications, scholars mainly discussed from three aspects: knowledge structure, ability structure and quality structure, and formed many consistent conclusions. However, in terms of professional specifications, especially specific application-oriented undergraduate talents training specifications based on different professional disciplines, it is most lacking at present. Only by strengthening the relevant research in this field can we make clear the knowledge that students need to learn, the technology they should master and the quality and ability they must possess, and further define the specific path of teachers' teaching, schools' running and enterprises' employment.

4.2 Strengthen the Establishment of Multi - subject Comprehensive Evaluation System Research

Proper talent evaluation system is the key to achieve the goal of talent training and enhance the competitiveness of students in the future employment. Since most application-oriented undergraduate graduates directly enter the frontline of enterprises after graduation, they need closer connection between the university and the enterprise, and the talent evaluation system of the school should also meet the requirements of the work unit and all sectors of society. Therefore, the quality evaluation system of applied undergraduate talent cultivation should implement multi-subject evaluation, from the traditional dual-subject evaluation of teachers and students to the multi-subject evaluation of the government, enterprises, parents and so on. Only by establishing a multi-subject and all-round evaluation system can we scientifically evaluate and effectively monitor the quality of every link of application-oriented undergraduate talent training, and provide a basis for decision-making.

4.3 Strengthen the Establishment of a Good System to Promote Students' Innovation and Entrepreneurship Ability

In the era of knowledge economy, the society not only needs professionals who master high and new technologies and can adapt to job requirements, but also needs entrepreneurial talents who can innovate jobs and have pioneering spirit. The cultivation of application-oriented undergraduate talents should not only pay attention to the cultivation of students' professional ability, but also pay attention to the cultivation of students' innovative spirit and entrepreneurial ability. Over the years, the cultivation of innovation and entrepreneurship ability has been difficult to implement, the reasons

come from many aspects. For example, the unified entrance examination system restricts the cultivation of students' practical ability and innovation ability to a certain extent. Application-oriented undergraduate teachers lack practical experience, and it is difficult to give students more practical training guidance; Application-oriented undergraduate is not closely connected with enterprises and provides students with few front-line learning opportunities. In addition, there are also deficiencies in the educational philosophy, training mode and management system of applied undergraduate. Therefore, further research on this field should become a new research hotspot.

5 Conclusion

By combing the relevant literature of application-oriented undergraduate talent training, it summarizes the talent training program and mode. Curriculum construction; Practice teaching and teaching reform four hot topics. At the same time, it puts forward three research fields that should be paid attention to in the future, including refining the professional specifications of talent training, establishing a multi-subject and all-round evaluation system, and creating a system to improve students' innovation and entrepreneurship ability.

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