



INTERNATIONAL JOURNAL OF
MODERN EDUCATION
(IJMOE)
www.ijmoe.com



BIBLIOMETRIC ANALYSIS OF RESEARCH ON THE EMPLOYABILITY SKILLS OF VOCATIONAL COLLEGES GRADUATES IN CHINA

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Article Info:

Article history:

Received date: 30.06.2025

Revised date: 20.07.2025

Accepted date: 25.08.2025

Published date: 04.09.2025

To cite this document:

Fan, X., & Mohd Noor, A. L. (2025). Bibliometric Analysis of Research on The Employability Skills of Vocational Colleges Graduates in China. *International Journal of Modern Education*, 7 (26), 517-529.

DOI: 10.35631/IJMOE.726034

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Abstract:

Since the fast development of vocational education and rapid enrollment of vocational college students in China, how to improve the students' employability skills has aroused a lot of attention among the whole society. This paper employed bibliometric method to conduct a systematic analysis of research literature on the employability skills of vocational college graduates indexed by CNKI in China from 2000 to 2024. Through keyword co-occurrence analysis, author collaboration network analysis, institutional distribution analysis, and research hotspot evolution analysis, it revealed the current state, development trends, and future directions of research in employability skills field. This study found that research on the employability skills of vocational college graduates is still an ongoing research gap concerning persons, the labor market, and vocational colleges. Moreover, the transfer of graduates' employability skills under the fast development of artificial intelligence necessitates immediate focus from the academic community.

Keywords:

Employability Skills, Vocational College Graduates, Bibliometric Analysis, Career Development, School-Enterprise Cooperation

Introduction

With the rapid development of China's economy and the transformation and upgrading of its industrial structure, vocational education has become an important avenue for cultivating skilled talents, and the employability skills of its graduates have become the focus of social

attention. Also, with the widespread expansion of vocational education in China and the intensification of competition in the job market, employability skills have become a hot topic of common concern among academia, the education sector, and the business community (Rong, 2024). The level of employability skills of vocational college graduates not only affected their personal career development but also related to the supply-demand balance in the labor market and the development of the economy (Yu, 2024). In recent years, China has introduced a series of policies to support the development of society vocational education, such as the "*National Vocational Education Reform Implementation Plan*" (2019) and the "*Opinions on Promoting the High-Quality Development of Modern Vocational Education*" (2021), further highlighting the importance of research on the employability skills of graduates in vocational colleges (Guo&Wu, 2024). Hence, Tushar and Sooraksa (2023a) found a prevalent mismatch between employers' expectations and graduates' possessed skills, a phenomenon not unique but widespread across many nations.

The primary objective of this study is to systematically review the literature on the employability skills of vocational college graduates in China via the CNKI resources for the past 25 years. It can provide a insight perspective for the researchers, policy makers, vocational colleges and government. This study revealed the current state of research, hot issues, and development trends in this field, providing a scientific basis for subsequent research. At the same time, the research findings of this paper can offer theoretical support for the formulation of education policies, curriculum reform, and students' career development.

Literature Review

Bibliometric Analysis

Bibliometric analysis was a popular and rigorous method for exploring and analyzing large volumes of scientific data (Donthu, Kumar, Mukherjee, Pandey, & Lim, 2021). And it was a quantitative approach employing mathematical and statistical instruments to assess the linkages and influences of publications, authors, institutions, and nations within a designated research domain (Fu et al., 2023). In contrast to conventional narrative reviews, by extracting and analyzing variables from each publication, such as author, institution, country, and keywords, bibliometric analysis can identify developmental trends and prospective research areas. Moreover, diverse visualization methods presented results in more intuitive and intelligible formats, allowing scholars to obtain a comprehensive overview, detect knowledge gaps, reveal developing patterns, and investigate the intellectual framework of a particular area (Donthu et al., 2021). Due to these benefits, bibliometric analysis has been highly popular in literature research in recent years.

Employability Skills

Employability skills, referred to as transferable or soft skills, were attributes and competencies that empower individuals to thrive in the workplace and adjust to evolving employment requirements (H. Zhang, Khaskheli, Raza, & Masood, 2023). Based on Yau and Kamaruzaman (2023), they were not tailored to specific jobs, rather, they enhanced performance and valued in the workplace and career advancement. These talents included proficiency, understanding, and attitudes that render an individual appealing to employers (Tushar & Sooraksa, 2023b). They were the fundamental competencies, personal attributes, and principles that empowered individuals to excel in every professional environment.

Methodology

This paper employed quantitative research and conducted the bibliometrics approach, combined with visualization analysis tools, to analyze the relevant literature for the past 25 years. Specifically, this method included keyword co-occurrence analysis, author collaboration network analysis, institutional distribution analysis, and research hotspot evolution analysis. Keyword co-occurrence analysis is extracting keywords from the literature, constructing a keyword co-occurrence network, and identifying the research hotspot and topic distribution. Author collaboration network analysis is analyzing the collaborative relationships between authors to reveal core authors and their research teams. Institutional distribution analysis is counting the number of publications by high-output institutions and analyze the contributions and impact of research institutions. Temporal evolution analysis is exploring the dynamic changes of research hotspots through time slicing analysis.

Data Collection

The China National Knowledge Infrastructure (CNKI) is considered as the most authoritative indexing resource for scientific and technical literature in China. This paper used it as the data source, retrieving literature on the topics of "*employability skills of vocational college graduates*" or "*employability skills of vocational students*" covering the period from 2000 to 2024, and obtaining a total of 2,752 valid documents. The types of documents included journal articles, theses, and conference papers.

Research Findings and Analysis

Number of Publications and Temporal Distribution

- From 2000 to 2010: The number of publications was relatively low, with an average annual output of less than 50 papers, and the research was in the initial exploratory stage. During this period, the research mainly focused on the definition and connotation of employability skills.
- From 2011 to 2020: The number of publications grew rapidly, with an average annual output of over 150 papers, marking a phase of rapid development in research. During this period, the research focus shifted to the factors influencing employability skills and strategies for its cultivation.
- From 2021 to 2024: The number of publications stabilized, with an average annual output of around 100 papers, marking a deepening phase of research. During this period, the research further focused on the new requirements for employability skills in emerging industries and international comparative studies.

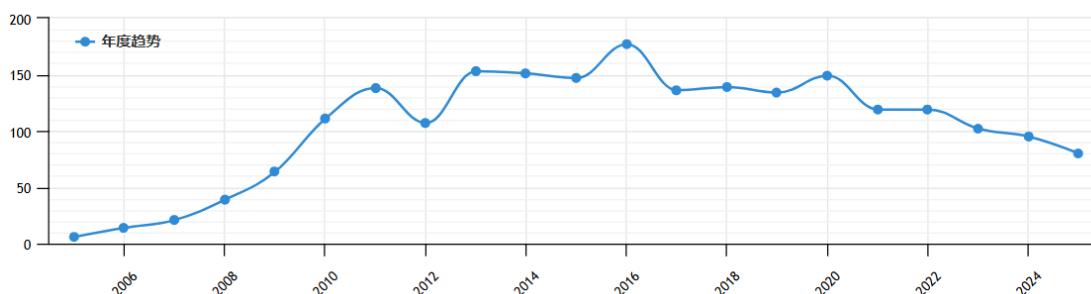


Figure 1, Number of Publications in Each Year From 2005 to 2024

Source: (<https://kns.cnki.net>)

Keyword Co-occurrence Analysis

High-frequency Keywords

Keywords provided essential information about the retrieved articles. Figure 2. generates the 6 most prominent terms from 2005 to 2024. In addition to the terms "employability skills" and "vocational college graduates," the most prevalent keyword is "employment," succeeded by employability skills, education, school-enterprise cooperation, labor market, curriculum, and professional qualities, among others. The two primary keywords have consistently been career planning and influencing factors, whereas the third keyword has fluctuated among competences, cultivation strategies. The keyword co-occurrence map (Figure 2.) produced 6 clusters. Each cluster represented a prominent research topic and signified the endeavors undertaken by scholars during the examined time.

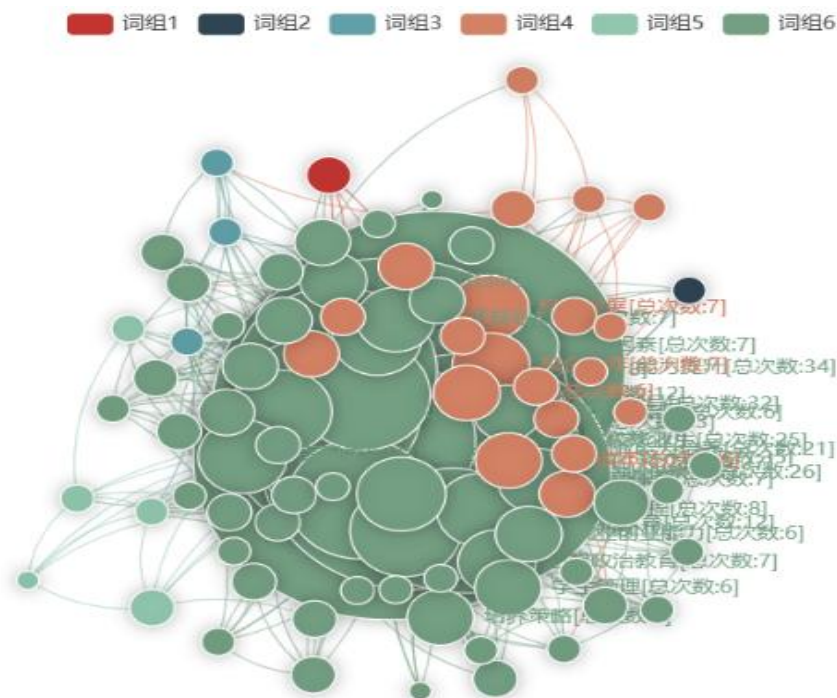


Figure 2, Co-Occurrence Map of High-Frequency Keywords

Source: (<https://kns.cnki.net>)



Figure 3, The Word Cloud Map of High-frequency Words

Source: (<https://kns.cnki.net>)

Research Hotspot

Composition of Employability Skills

Wu (2024) summarized that employability skills included professional skills, occupational qualities, general abilities, etc. Zhao&Zheng (2024) supported to defined employability skills as "*the comprehensive ability of an individual to obtain and maintain employment in the labor market.*" Generally, the definition and connotation of employability skills are usually defined as the comprehensive ability of an individual to obtain and maintain employment in the labor market, adapt to changes in work, and achieve career development. It not only included professional skills but also encompassed general skills.

Chen (2022) indicated that employability skills is a multidimensional structure, with common dimensions including: professional skills, such as, specialized skills, career planning abilities, career adaptability; social skills, such as, interpersonal skills, teamwork abilities, leadership abilities; personal traits, such as, self-management abilities, stress resistance abilities, innovation awareness; metacognitive abilities, such as, self-reflection abilities, learning abilities, information processing skills.

Different Perspectives of Employability Skills

Shi (2021) investigated the employability skills from the following different perspectives: from employer's perspective, employers placed more emphasis on students' practical skills, professional qualities, and teamwork abilities; from student perspective, students were more focused on professional skills and career development opportunities; from school perspective, the school focused on enhancing students' overall employability skills through curriculum design and school-enterprise cooperation.

Influencing Factors of Employability Skills

Researchers focused on the factors of influencing employability skills:

Cai (2011) examined the subsequent individual components. Students in science and engineering typically possess superior employability skills compared to their counterparts in the humanities and social sciences. Gender disparities exist, with males demonstrating greater proficiency in career development abilities, whereas females excel in communication skills and professional attributes. Additionally, students who have held leadership positions significantly surpass those without such experience in employability skills.

Educational factors: career planning, hands-on training, and curriculum design greatly improve employability skills; school-business partnership, including internships and practical training, is essential for enhancing students' employability abilities; students' capacity for invention and entrepreneurship, as well as their potential for career advancement, are significantly enhanced by entrepreneurship education (Chen, 2022).

Social factors: labor market demand necessitates that the development of employability skills is closely connected with market requirements; policy assistance, including government employment policies and vocational education reforms, significantly influences this alignment (Qian, 2021).

Employability Skills Evaluation Models

There were two main model. Competency Model: based on McClelland's competency model, Chen (2022) suggested that employability skills are divided into baseline skills (such as knowledge and skills) and distinguishing skills (such as self-concept and motivation). Career Competency Model: Wu (2024) discussed that employability skills are divided into three dimensions: feedback ability, communication ability, and behavioral ability.

Measuring Tools

Survey was the main tool of measuring the employability skills. The employability skills of graduates can be objectively evaluated by the development of a questionnaire with multiple dimensions. The actual employability skills of graduates was reflected in the evaluation of graduates' work performance by companies. The evaluation was carried out by employers (C. Zhang, 2014). Through the process of self-evaluation, students gain an understanding of the factors that contribute to their employment strengths and shortcomings (Shi, 2021).

The Challenges of Cultivating Employability Skills

In order to improve the development of vocational education, career planning and job advisory courses are typically offered by higher vocational colleges; nevertheless, their structure and content still require improvement. Although industry-academia collaboration has emerged as a significant means of improving students' employability skills, there is still need to improve the scope and depth of this partnership. Several higher vocational colleges have emphasized entrepreneurship education, while, its efficacy and popularity still require improvement (Chen, 2022).

As the fast development of society and artificial intelligence, new forms of employment emerged, such as, platform economy and sharing economy. It has raised new requirements for employability skills, such as flexible employment capabilities and cross-domain mobility

capabilities (Zheng, 2015). Also, individual differences impacted on their employability skills. Zheng (2015) examined that students have significant differences in their professional backgrounds, personality traits, and career interests, making it a challenge to provide personalized employability skills development plans. For the policy implementation aspect, despite the government's introduction of a series of vocational education reform policies, there are still many issues in the actual implementation process, such as insufficient incentive mechanisms for school (Gu, 2021).

Author Collaboration Network Analysis

- Core Authors: Among the core authors, there are scholars like Yu Jingbo, Lin Xibao, and Gu Hui who have a significant number of publications, which together constitute a reliable research team. The team led by Yu Jingbo has published a total of 22 articles during the past few years. Furthermore, the team of Lin Xibao has published eight articles. They are both from Qingdao, which is located in the province of Shandong.

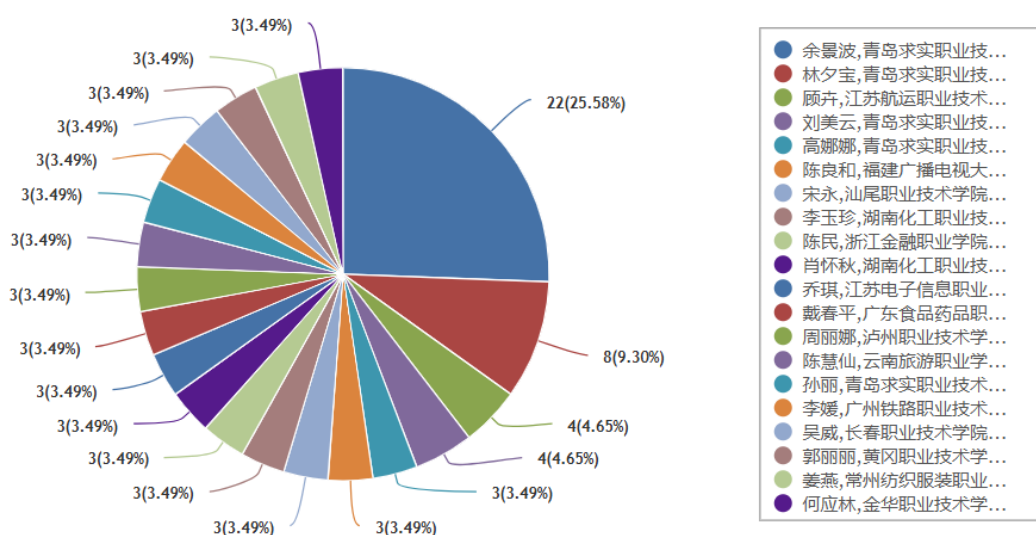


Figure 4: The Core Author of Employability Skills

Source: (<https://kns.cnki.net>)

- Collaboration Network: Although the key authors work together closely, the entire collaboration network is quite fragmented, and there is a need to increase cooperation between different institutions. For instance, Zhang and Li have collaborated on the writing of a number of research publications about the components that make up employability skills.



Figure 5: The Collaboration Network of Research on the Employability Skills

Source: (<https://kns.cnki.net>)

Institutional Distribution Analysis

- High-output institutions: Institutions such as Hunan Normal University, Qingdao Qiushi Technical College, Xinan University, etc., have a higher volume of publications.

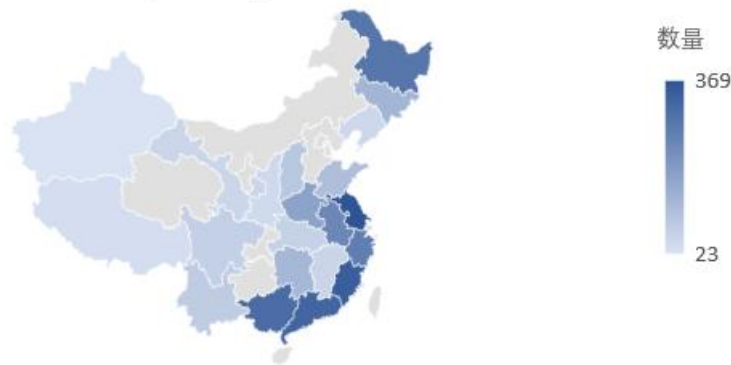
Table1: Top 10 Most Productive Institution

Ranking	Institution	Publications
1	HunanNormalUniversity	30
2	QingdaoQiushiTechnicalCollege	22
3	XinanUniversity	22
4	TianjingUniversity	20
5	HudongNormalUniversity	19
6	HunanAgricultureUniversity	18
7	HebeiNormalUniversity	17
8	ShangdongNormalUniversity	16
9	JiangyinTechnicalCollege	15
10	WuxiTechnicalCollege	15

Source: (<https://kns.cnki.net>)

- Regional distribution: Research institutions are mainly concentrated in the eastern coastal areas, with relatively less research in the central and western regions. For example, the publication volume of research institutions in Jiangsu Province and Guangdong Province accounts for more than 30% of the national total.

The Map of Regional Distribution

**Figure 6: The Regional Distribution of The Research Institution**

Source: (<https://kns.cnki.net>)

- High-output journals: Journals such as Modern Vocational Education, Education and Vocational, The journal of Liaoning Vocational College, have the top number of publications on the employability skills.

Table 2: Top 10 Most Productive Journals

Ranking	Institution	Publications
1	ModemVocationalEducation	66
2	Education and Vocational	39
3	Liaoning VocationalCollege	38
4	Caizhi	36
5	HunanNormalUniversity	27
6	VocationalEducation	27
7	ScienceTechnology	24
8	ShanxiYouth	24
9	CultureInformation	22
10	AdultEducation	21

Source: (<https://kns.cnki.net>)

Evolution of Research Hotspots

- 2000-2010: The research focus was on the definition and connotation of employability skills. For example, Liu (2006) proposed a preliminary theoretical framework for employability skills.

- 2011-2020: Research focus shifted to the factors influencing employability skills and strategies for its development. For example, Haisheng, Shibin, and Deyi (2016) studied the impact of school-enterprise cooperation on employability skills. How to address the challenges brought by new employment forms, such as the boundaryless nature of careers and the flexibility of employment methods also caught a lot of attention. The role of innovation and entrepreneurship competence in employability skills was becoming increasingly prominent, and how to enhance students' innovation and entrepreneurship competence through entrepreneurship education has become a research hotspot. Meanwhile, the application of

professional competence models in employability skills research was gradually increasing, especially in the context of new employment forms.

- 2021-2024: Research has further deepened, focusing on the new requirements for employability skills in emerging industries and international comparative studies. For example, Zhao (2024) explored the new challenges to the employability skills of vocational college graduates in the era of artificial intelligence.

Discussion

This study has systematically review the literature on the employability skills in China for the past 25 years via CNKI resources. Research on the employability skills of graduates from vocational colleges in China has established a relatively comprehensive theoretical framework encompassing the definition of employability skills, their constituent elements, influencing factors, and cultivation strategies. The research methodologies and perspectives have progressively diversified, evolving from initial theoretical discussions to incorporate empirical studies and interdisciplinary approaches. Notably, significant advancements have been achieved in delineating the structural dimensions of employability skills and developing corresponding evaluation methods.

However, a critical review of the literature reveals several limitations in the current body of research. Firstly, there is a predominance of a singular educational perspective, with insufficient incorporation of interdisciplinary viewpoints such as psychology, sociology, and related fields. Secondly, empirical research remains limited, as existing studies often rely on theoretical discourse without the support of large-scale survey data or longitudinal investigations. Thirdly, there is a lack of attention to regional and industrial heterogeneity; the majority of studies focus on the more economically developed eastern regions, with inadequate exploration of central and western regions as well as emerging industries.

Future research trajectories should address these gaps by emphasizing interdisciplinary collaboration that integrates psychology, sociology, education, and other disciplines to provide a holistic understanding of employability skills. Additionally, longitudinal studies tracking students from enrollment through to graduation are essential to assess the sustained impact of various educational models on employability outcomes. Policy-oriented research aimed at enhancing employability through supportive measures and the integration of social resources is also anticipated to gain prominence.

Further exploration is warranted to identify specific factors influencing employability skills via large-scale surveys and robust data analysis. Particular focus should be given to emerging industries, such as artificial intelligence and big data, to understand the evolving skills demands within these sectors. International comparative studies can provide valuable insights by adapting advanced foreign training models to the Chinese vocational education context. Moreover, refining the multidimensional structure of employability skills, especially under new forms of employment, remains a key area for development. Research should also optimize pathways for employability enhancement through curriculum design, school-enterprise partnerships, and entrepreneurship education. Emphasizing individual differences by developing personalized employability skill development plans will further contribute to tailoring education to diverse student needs. Overall, integrating policy support and social

resource mobilization will be crucial to effectively fostering employability skills among vocational college graduates.

Contributions

Research on employability skills in vocational colleges in China has made significant contributions to both academic inquiry and industry practice. Academically, it has advanced the theoretical framework by elucidating the definitions, components, influencing factors, and cultivation strategies of employability skills, employing diversified methodologies that span theoretical, empirical, and interdisciplinary approaches. From an industry perspective, the research identifies sector-specific skill requirements, particularly in emerging fields such as artificial intelligence and big data, thereby guiding workforce development and recruitment practices. It facilitates enhanced school-enterprise collaboration, promoting practical training and employment readiness. Additionally, the findings inform policy recommendations that integrate social resources and support entrepreneurship education tailored to contemporary market needs.

Conclusion

The research objective in this study has achieved. This study systematically reviewed the current state of research on the employability skills of graduates in Chinese vocational colleges using bibliometric methods, revealing research hotspots and development trends. The study found that research on the employability skills of vocational college graduates has evolved from initial exploration to in-depth development, with current hotspots focusing on the composition, influencing factors, and cultivation strategies of employability skills.

Recommendations

Future research should take into account China's national conditions, further deepen theoretical research and practical exploration, and provide scientific evidence for the reform and development of vocational education, especially, take more action to adapt the new changes of the development of artificial intelligence to meet the requirements of fast development of the whole society.

Acknowledgement

The authors gratefully acknowledge Faculty of Language Studies and Human Development, University Malaysia Kelantan for their financial support. We also extend our sincere gratitude to Dr. Khairul Azhar Bin Mat Daud for his valuable insights and constructive feedback. Finally, we appreciate the anonymous reviewers for their thoughtful suggestions that greatly improved this work.

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