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Big Data-Driven Management of Employment Positions in Universities: Research on the Practical Path of Improving the Employment Quality of College Graduates

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Abstract: This article explores the application of big data technology in the management of college employment positions and how to enhance the employment quality of college graduates through big data-driven approaches. By analyzing the current status and trends of big data management for college employment positions at home and abroad, a set of big data-driven practical pathways for college employment position management is proposed, including data collection and management, employment position analysis and forecasting, precise employment services, and employment effect evaluation and feedback. The article also discusses the challenges faced by big data technology in college employment management and corresponding strategies. Through these practices, big data technology significantly enhances the personalization and precision of employment services and strengthens the alignment of educational content with market demands, providing a solid data support for college employment management.

1. Introduction

With the popularization of higher education and the increasing number of college graduates year by year, the issue of employment for college graduates has become a focus of social attention. In recent years, although the government has introduced a series of policies to promote the employment of college graduates, the employment situation for college graduates remains severe due to various factors such as economic restructuring, industrial upgrading, and changes in market demand. Graduates face fierce competition for employment, with a prominent mismatch between job supply and demand. There are structural differences between the talents cultivated by universities and social demand, resulting in low employment quality and satisfaction among graduates. Meanwhile, the asymmetry of employment information and the inadequacy of employment services are also important factors affecting the employment of graduates. The existence of these problems not only affects the personal development of graduates, but also poses new challenges to the reform of higher education and talent cultivation. In today's rapidly developing information technology, the application of big data technology provides new ideas and tools for solving the employment problems of college graduates. Big data technology can collect, store, process, and analyze massive amounts of data to reveal patterns and trends behind the data, providing scientific decision support for university employment management.

This study aims to explore the application of big data technology in the management of

employment positions in universities, and how to improve the employment quality of college graduates through big data driven approaches. By analyzing the current situation and trends of big data management for employment positions in domestic and foreign universities, this study will propose a practical path aimed at providing scientific and effective solutions for employment management in universities, in order to achieve the goal of improving the quality of graduates' employment.

2. Literature Review

(1)Current situation abroad

In the international field, the application of big data technology in university employment management has made certain research progress. Research has shown that by building a comprehensive employment information platform and collecting and analyzing employment data of graduates, the personalization and accuracy of employment services can be effectively improved. For example, some universities in Western countries use big data technology to track and analyze students' employment preferences, skill levels, and career development paths, in order to optimize course offerings and teaching content and better meet market demand. In addition, foreign research also focuses on how to predict employment market trends through big data analysis and provide students with forward-looking employment guidance. Major foreign recruitment websites mainly include LinkedIn, Monster, Career Build, Simply Hired, Indeed, Seek, etc [1].

LinkedIn, leveraging its social attributes, primarily targets professionals in the workplace to drive recruitment. Its main advantage lies in its globalization, which allows it to connect with companies and talents from different countries and regions. For some multinational companies, it can also provide relatively comprehensive recruitment plans; Monster is currently the world's largest professional recruitment website, mainly providing online recruitment, talent exploration, recruitment solutions and other related services, providing job seekers with recruitment information, and providing personal information databases for enterprises; Career Build provides job seekers with the latest recruitment information, job search, resume submission, career counseling, interview skills, and other job seeking services. Simply Hired integrates various top resources, content newspapers, and company recruitment websites into a one-stop service. Job seekers can search finely according to job categories, locations, job types, education, work experience, and other conditions; Google, Amazon and other technology companies or Internet companies have their own recruitment systems, but the functions are relatively simple. They mainly provide job seeking recruitment functions, and cannot provide personalized services like recruitment websites [2].

(2)Domestic situation

In China, with the rapid development of big data technology, more and more universities are exploring its application in employment management. Domestic scholars mainly focus on the role of big data technology in job market analysis, job matching, and improving the quality of employment services. Some studies have constructed employment big data analysis models to analyze the employment flow, industry distribution, and salary levels of graduates, providing data support for employment guidance and policy formulation in universities. Meanwhile, research has also explored the role of big data technology in improving the efficiency of employment services, such as providing more efficient matching services for graduates and employers through intelligent recommendation systems.

(1) Various social recruitment platforms

The main social recruitment platforms in China include 51job, Liepin, Boss Direct Recruitment, Zhilian Recruitment, etc. 51job provides recruitment information publishing function for enterprises and job search and resume submission function for job seekers; In addition to providing job search information, Liepin.com also offers interaction between headhunters and job seekers; Boss Direct Hiring provides a direct communication channel between job seekers and company

bosses. These new recruitment websites often tend to use innovative recruitment methods to attract the attention of job seekers and achieve a two-way selection between the company and job seekers. However, after job seekers submit their resumes, the rest of the steps need to be completed offline, ignoring the importance of their accumulated recruitment data[3][4].

(2) Various university employment platforms

Most domestic universities have established employment service platforms. Taking two universities as an example, Dongguan University of Technology has developed and built multiple information platforms such as the Graduate Employment Information Network, Information Center, and Learning Platform based on the construction of a first-class smart education service management system. The recruitment information of employers is accurately pushed to the graduate WeChat end according to their majors. Dynamically adjust the recruitment and hiring units, improve the professional matching rate of positions, and provide more targeted positions for applicants accurately; Jinhua Vocational and Technical College has implemented a platform to collect and share employment information, efficiently complete employment service matters in one application, facilitate precise adaptation of high-quality positions with one click, and conduct intelligent analysis of employment data through online integration. The "Golden Career Employment" WeChat service account pushes at least 3 "potentially interesting" job positions to unemployed graduates every day[5]. Establish a mechanism to collect employment positions, create a pool of job opportunities, and provide real-time feedback on the adequacy of these opportunities for graduates based on their fields of study.

(3) Various government and public institution employment platforms

The employment service platform of Zhuhai Human Resources and Social Security Bureau guides employers to actively participate in various job fairs, and gives full play to the role of "Zhuhai Youth" WeChat official account and other platforms to promote college students' employment. Shenzhen Guangming District Human Resources Bureau has built Guangming Employment Network, "Guangming Employment" WeChat official account, etc. Employers need to register their employer information in real name on the official designated platform of Guangming Employment Network, and job seekers can apply online through the platform search function.
Provide job seekers with online courses, skills training, and other services to enhance the effectiveness of integrating supply and demand.

In summary, the application of big data technology in university employment management has enormous potential and value, covering multiple aspects such as employment information services, employment guidance, and employment tracking. However, based on the current situation of online job recruitment mentioned above, the main problem is that existing websites generally do not mine the hidden information in recruitment data. Most online recruitment websites only provide the function of exchanging recruitment information and do not continue to follow up on the process of collecting resumes, making it difficult for job seekers to have a clear understanding of the subsequent recruitment process. Even after the process has ended, it is difficult to detect, and the degree of visualization of the recruitment process is not high. This study will further explore the specific application paths of big data technology in the management of employment positions in universities, and how to improve the employment quality of college graduates through these technologies[6].

3. The Practical Path of Big Data Driven Employment Management in Higher Education Institutions

(1) Data Collection and Management

In the big data-driven management of employment positions in universities, data collection and management are fundamental and crucial steps. Firstly, it is necessary to establish a comprehensive database of employment information for graduates, which should include multidimensional data

such as basic information, professional background, skills and specialties, employment intentions, internship experiences, etc. These data can be collected through various channels such as graduate employment management systems, online survey questionnaires, social media platforms, and cooperation with enterprises. In addition, in order to ensure the timeliness and accuracy of data, it is necessary to implement a mechanism for real-time updating and maintaining employment position data. This includes tracking the employment status of graduates, updating recruitment information for companies, and monitoring industry trends. Through such dynamic management, universities can respond to market changes in a timely manner and provide graduates with the latest employment information and opportunities.

(2) Analysis and Prediction of Employment Positions

Utilizing big data technology for analyzing employment market trends is an important means of improving the quality of employment services. By analyzing historical employment data and current market trends, universities can identify which industries and positions are growing and which are declining, providing graduates with insights into market trends. Meanwhile, big data technology can predict future job demands. By constructing predictive models and combining factors such as economic forecasts, industry development trends, and changes in education policies, universities can predict the future demand for specific majors and skills. These predicted results are crucial for the professional settings and talent cultivation plans of universities, helping them adjust their educational content to better meet the needs of society and the market.

(3) Precision employment services

A precise employment recommendation system based on big data is the key to achieving personalized employment services. By analyzing the personal characteristics and employment preferences of graduates, combined with job demands and enterprise characteristics, recommendation systems can match the most suitable employment opportunities for graduates. At the same time, universities can also provide personalized employment guidance and services, including career planning consultation, resume and interview skills training, career development seminars, etc. By analyzing the employment readiness of graduates through big data, universities can provide customized employment support for graduates with different needs[7].

(4) Employment Effect Evaluation and Feedback

Utilizing big data for employment effectiveness evaluation is an important step in optimizing employment services. Universities can evaluate the effectiveness of employment services by analyzing the employment outcomes of graduates, such as employment rates, job matching, salary levels, and other indicators. These evaluation results can help universities identify the strengths and weaknesses in employment services, providing a basis for further improvement. Meanwhile, establishing an employment feedback mechanism is crucial for continuously optimizing employment services. Universities can regularly collect feedback from graduates and employers to understand their satisfaction and suggestions regarding employment services. Through such two-way communication, universities can adjust their employment service strategies in a timely manner to better meet the needs of graduates and the market.

4. Successful Case Study

(1) The "Employment Insights Platform" of Georgia Institute of Technology in the United States. The Georgia Institute of Technology has developed a tool called the "Employment Insights Platform," which utilizes big data and machine learning technologies to analyze students' employment data, predict employment outcomes, and provide data-driven career recommendations for students.

(2) Tsinghua University's' Career Development Big Data Platform '. This platform integrates multi-dimensional data such as students' academic performance, personal interests, and corporate recruitment information to provide accurate employment matching services for students. Through

this platform, schools can adjust their education and training programs in a timely manner to better meet market demand[8].

(3) The "Employment Data Analysis System" of Huazhong University of Science and Technology. This system provides transparent employment data for current students by analyzing their employment destinations and career development paths, helping them understand the employment prospects of different majors and skills.

The above series of successful practical cases have provided us with valuable experience. These cases reveal effective strategies and replicable experiences for the application of big data technology in the field of education, manifested in the following aspects:

(1) Data integration and analysis: Successful cases collectively emphasize the importance of universities in integrating and analyzing student data. By integrating multidimensional data such as students' academic performance, personal interests, and career preferences, universities can provide more personalized career development advice for students, thereby more accurately meeting their employment needs.

(2) Technical application: The university in the case utilizes advanced technologies such as machine learning and data mining to analyze and predict trends in the job market. The application of these technologies enables universities to more accurately grasp market trends, provide forward-looking employment guidance for students, and enhance their competitiveness in employment.

(3) Transparent employment data: Providing transparent employment data is crucial for enhancing students' career planning abilities. By publicly disclosing the employment prospects and career development of graduates, universities help students have a clearer understanding of the employment prospects of different majors and skills, thereby making more informed career choices.

(4) Matching education with market demand: The universities in the case all attach great importance to aligning educational content with market demand. By analyzing employment data, universities can adjust their major offerings and course content in a timely manner, better adapt to market changes, and improve the pertinence and practicality of education.

(5) Continuous optimization and feedback: Finally, these universities have established mechanisms for continuous optimization and feedback. By collecting feedback from students and monitoring changes in the job market, universities can continuously improve employment services, enhance employment quality, and ensure that graduates can meet market demands.

It can be seen that big data technology has shown great potential in improving the quality of employment for graduates. By integrating and analyzing student data, utilizing advanced technology, providing transparent employment information, aligning education with market demand, and establishing a continuous optimization and feedback mechanism, universities can effectively improve the employment quality and satisfaction of graduates. These practices not only provide replicable models for other universities, but also provide effective impetus for promoting high-quality and full employment for college graduates.

5. Challenges and Countermeasures

In the field of employment management in universities, the application of big data technology has brought unprecedented opportunities, but also a series of challenges. Here are several key challenges and their corresponding countermeasures and suggestions:

Key challenges:

(1) Data privacy issues. With the widespread application of big data technology in university employment management, the issue of personal information security for students and faculty has become particularly important. Data privacy breaches not only harm individual rights, but may also have a serious impact on the reputation of universities.

(2) Accuracy and completeness of data. The accuracy and completeness of employment data are crucial for universities to formulate employment policies and adjust education programs. However,

due to the diversity of data sources, large and complex data volume, ensuring the accuracy and completeness of data is a daunting task.

(3) Technical capabilities and resource limitations. Universities may encounter limitations in technical capabilities and resources when implementing big data projects, including a lack of professional data analysts, insufficient data processing tools, and limited funding, all of which may affect the application effectiveness of big data technology in university employment management.

(4) Difficulties in data sharing and integration. The sharing and integration of data among various departments within universities, as well as between universities and external institutions, is also a challenge. The data standards and formats between different departments and institutions may not be consistent, leading to difficulties in data integration and affecting the efficiency of big data technology applications.

Related countermeasures and suggestions:

(1) Strengthen data privacy protection. Universities should establish strict data privacy protection policies and measures, including technical means such as data encryption, access control, and anonymization processing, to ensure the security of personal data. Simultaneously, strengthen data privacy education for both teachers and students, thereby enhancing their awareness and understanding of data protection.

(2) Improve data quality and management. Universities should establish a data quality management mechanism to ensure the accuracy and completeness of data. This includes regular data auditing, cleaning, and updating, as well as establishing data quality assessment standards and utilizing advanced data technologies and tools such as data mining and machine learning to improve the efficiency and accuracy of data processing.

(3) Enhance technical capabilities and resource investment. Universities should increase investment in big data technology and talent, including introducing professional data analysts, purchasing advanced data processing software and hardware, providing data technology training, and seeking cooperation with enterprises or research institutions to share resources and technology, in order to improve the application capabilities of big data technology.

(4) Promote data sharing and integration. Universities should establish unified data standards and formats to promote data sharing and integration among internal departments. Meanwhile, universities can establish data sharing mechanisms with other universities, enterprises, and government agencies to obtain more comprehensive and diverse data resources. This requires coordination and cooperation among universities in terms of policies and technology.

Through the above measures and suggestions, universities can effectively address the challenges faced by big data technology in employment management and fully leverage the potential of big data technology in improving the quality of employment for graduates.

6. Conclusion

In this article, we delve into how domestic and foreign universities can use big data technology to improve the employment quality of graduates. Through case analysis, we found that big data technology plays a crucial role in university employment management. It can not only integrate and analyze the personal data, employment preferences, and market trends of graduates, provide personalized employment services and career development advice, but also help universities adjust their education and training programs in a timely manner to meet market demand and enhance the employment competitiveness of graduates. In addition, big data technology also helps universities establish employment feedback mechanisms, monitor and evaluate employment outcomes in real time, and continuously optimize employment service strategies. Overall, big data technology has significantly improved the personalization and accuracy of employment services, strengthened the connection between educational content and market demand, and provided solid data support for employment management in universities.

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