Research on the Innovation of Graduate Educational Administration Management Mode under the Background of Big Data

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Abstract: In recent years, big data technology has been developed rapidly, among which data management and data analysis in big data technology are widely used at present, and have been successfully applied in all walks of life. Applying big data technology to the field of education is the current mainstream trend, and the use of big data technology for graduate education management is also one of the current hot topics. However, there are still many deficiencies in the existing graduate educational administration management mode. Therefore, this paper puts forward the innovation research of graduate educational administration management mode under the background of big data. This paper makes an in-depth investigation on the main problems existing in the traditional mode of graduate educational administration management in Colleges and universities. According to the results, the main problems are the lack of sense of belonging to the class, poor information transmission, and the disconnection between class management and tutor management. In view of these problems, this paper proposes an optimization and improvement scheme based on big data technology. According to the actual needs of the current graduate education management in China's colleges and universities, combined with the advanced big data management and analysis technology, the program establishes a new big data technology university graduate educational administration management mode. The improvement scheme of this paper makes up for the shortcomings of the traditional mode of graduate educational administration. The corresponding survey results show that the graduate management mode based on big data technology can better integrate the school network resources, improve the management ability of the school and meet the needs of students.

Keywords: Big Data Technology, Educational Administration, Graduate Management, Data Analysis
1. Introduction
The main feature of big data era is the explosive growth of a large amount of social information. For college students, their life, learning and communication environment has changed greatly, which brings great opportunities and challenges to their management. In the era of big data, how to deal with a large amount of information has become an important problem faced by college students' managers [1-3]. College student managers should also learn to tap the internal advantages and values of big data in the diversified, massive and complex information resources, and actively change the management concept. Only in this way can big data create the management practice mode of College Students under the background of big data [4-6].

At present, China's graduate management system has been initially constructed, including graduate education management system, thesis review system, student status management system, etc. However, these data are independent and complex, which makes it difficult to save and update the graduation data. But too much data is piled up together, which greatly reduces the value of these data [7-8]. Therefore, the management of graduate data is a difficult problem for education managers. Big data has the characteristics of large capacity, multiple types, high accessibility of data blocks and high application value. With the development of information technology, big data has been gradually applied to all areas of our lives. In order to improve the quality of graduate education management, education managers can take advantage of the opportunities and challenges brought by the era of big data, optimize educational resources, and provide help for graduate education management [9-10].

This paper investigates and studies the main problems existing in the traditional mode of educational administration of Postgraduates in Colleges and universities. According to the survey results, there are still deficiencies in the educational administration of Postgraduates in China, which leads to the lack of sense of class belonging, poor information transmission, and disconnection between class management and tutor management. Nutrition has had an adverse effect. In view of these problems, this paper puts forward the optimization and improvement scheme for the traditional management mode of graduate education. The optimization and improvement scheme of this paper mainly adopts the big data correlation analysis method to analyze the graduate management data, and according to the actual needs of graduate educational administration management, combined with the big data technology, the mode is improved. Compared with the traditional mode, the improved management mode pays more attention to data collection and analysis, and excavates the value of big data through the integration of big data, so as to provide basic data for the reform of educational administration mode of graduate students in Colleges and universities in China. The analysis shows that the application of big data technology to graduate educational administration management is the mainstream trend in the future, but there are still many deficiencies, which should be gradually improved in the process of practice.

2. Big Data Technology and Graduate Education Management

2.1 Role of Big Data Technology in Graduate Education Management
Big data technology can provide dynamic management, behavior analysis, prediction and alarm management mode for graduate students. To a certain extent, it can improve the quality level of graduate education management and improve the scientificity and accuracy of quality evaluation. Big data technology can improve the scientificity of graduate education management level. Graduate education management data system can quickly and accurately collect the data of students and tutors, and can also comprehensively record personal social activities and learning activities. Through the analysis of these data, we can find the effective information in these data and the relationship between individuals and information. Under the processing of big data system, the data can be retrieved quickly according to the needs of the evaluation subject, which greatly shortens the data collection time and improves the timeliness of quality evaluation.
2.2 Big Data Correlation Analysis Method

Through the analysis of some related factors of these big data, we can make a comprehensive analysis of all the data that affect these factors. The common linear correlation analysis methods are: coefficient of function linear correlation method and causal analysis of function Granger. Among them, Granger causality analysis can only directly draw a qualitative calculation conclusion, and can not describe any quantitative results linearly. Therefore, we use the algorithm to calculate the coefficient of variables linearly.

Mathematical description of Relation Number: if variables $X$ and $Y$ are set, the variance is:

$$E(Y - EX)(Y - EY)$$

The correlation coefficients were as follows:

$$\rho_{xy} = \frac{\text{Cov}(X,Y)}{\sqrt{DX \cdot DY}}$$  \hspace{1cm} (2)

$\rho_{xy} > 0$, table positive correlation; $\rho_{xy} < 0$, the negative correlation $\rho_{xy}$ value of the table is closer to 1, indicating the $X$ of variables, the higher the correlation degree of $Y$; the closer the value of $\rho_{xy}$ is to 0, the lower the correlation degree of $X$ is $Y$.

3. Investigation and Research on the Main Problems Existing in the Traditional Mode of Educational Administration of Postgraduates in Colleges and Universities

In order to further strengthen and improve the ideological and political education of college students, the Party Central Committee and the State Council stressed: "classroom is the basic organizational form of college students, and the main organizational carrier of College Students' self-education, self-management and self-service. Strengthen the collective construction of classes, organize and hold rich theme class meetings, and give play to the role of students' unity, organization and education. This fully proves the importance of college students in Ideological and political education. Effective management of graduate courses is of great significance to the smooth progress of Ideological and political education of graduate students. This study investigates the management mode of graduate education in 30 universities in China. A total of 600 questionnaires were distributed and 589 were collected.

According to the survey results in Table 1, among the 30 universities surveyed, only one university has adopted the big data intelligent management mode, while the other 29 universities have adopted the traditional education management mode. It can be seen that at this stage, the management mode of graduate education in most colleges and universities adopts the traditional classroom arrangement mode, that is, students of the same grade are arranged according to their majors, which makes the tutors of students may appear in multiple categories at the same time, but big data technology can be used for effective management and data analysis. The analysis shows that the traditional course scheduling mode has the advantages of the same grade students, easy to carry out sex education activities, with the same characteristics, and easier to carry out daily education management services. But at the same time, there are also many deficiencies in data management and information analysis.

| Serial number | Main problems                                       |
|---------------|-----------------------------------------------------|
| 1             | Graduate students lack the sense of belonging to the class |
| 2             | Poor information transmission                       |
| 3             | Class management is out of touch with tutor management |
| 4             | Poor organizational concept and discipline           |
| 5             | Weak collective consciousness, single form of communication |
4. Discussion

4.1 Application of Big Data Technology in Graduate Education Administration Management

In the era of mobile Internet and big information, the comprehensive utilization of big data has gradually become a major development trend of graduate education system reform and teaching innovation in China. Using teaching big data information technology to carry out the higher education teaching management information service of university graduate students is not only the overall development demand of university graduate students, but also the overall improvement requirement of the quality of university education service. In recent years, some universities in China have carried out a comprehensive reform of graduate education, which provides a lot of useful reference materials for the innovation of graduate education management mode under the background of big data. Colleges and universities should speed up the pace of establishing graduate education management service system based on big data technology and big data, and at the same time, it should remind all kinds of problems exposed in the process of reform and innovation.

According to the survey results in Figure 1, there are five problems in the application of big data technology in educational administration management of Postgraduates in Colleges and universities, such as being greedy for many things, seeking novelty, ignoring the needs of students (A), completely replacing experience judgment with big data analysis results (B), insufficient data management standardization (C), insufficient data security protection (D), and difficult information fusion (E). The analysis shows that this is mainly due to the lack of effective management mode and corresponding theoretical guidance in the application of big data to postgraduate management in China, which should be adjusted according to the effect in the actual application process.

![Figure 1. main problems existing in the application of big data technology in graduate educational administration management in Colleges and Universities](image)

Even if the current application of big data technology for graduate education management is still
insufficient, but the advantages of using big data technology for management are still obvious. According to the survey results in Figure 2, after applying big data technology to graduate educational administration management in many universities, the main effects include the change of teaching concept (F), the diversification of teaching methods (G), the richness of teaching and management (K), the enhancement of organization and guidance ability (L), and the enhancement of the ability of integrating network resources (M) change. The analysis shows that the use of big data technology for graduate education management in general is more advantages than disadvantages, which mainly comes from the lack of proficiency in technology and the lack of corresponding management mechanism, which should be strengthened in practical application.

Figure 2. main effect of applying big data technology to graduate educational administration management in Colleges and Universities

4.2 Data Cleaning

Before data clustering analysis, in order to ensure the accuracy of clustering, it is necessary to clean up the analyzed data, including numerical conversion, expected statistics, singular value removal and standardization. This paper mainly cleans and filters the data extracted from IP domain packets, CS domain signaling data and customer CRM data, and finally obtains useful data information. In the data standardization operation, due to the choice of voice, traffic and charge data, there is a big gap in the data range. The standardization method used in this paper is deviation standardization, as shown in formula (3), where $x_i$ is the data element to be processed, $\min \{x_i\}$ and $\max \{x_i\}$ are the minimum and maximum values in the data respectively, and $y_i$ is the standardized output data.

$$y_i = \frac{x_i - \min \{x_i\}}{\max \{x_i\} - \min \{x_i\}}$$  (3)
4.3 Highlighting Big Data Integration and Mining Big Data Value

Mining the value of big data is to integrate resources into data. At present, many campus network systems are operating independently, and the data fragmentation of Internet, mobile microblog and wechat is more prominent. Although the concept of big data management is very clear, it is clear. However, there are still many technical difficulties in practice. Therefore, colleges and universities should strengthen the construction of teachers' professional team, especially the construction of big data analysis team, attract excellent data mining personnel and technical tools, and collect and integrate the existing data in the application system. Colleges and universities should highlight the awareness of big data management, pay attention to the integration of different database data, especially to break through the data barrier and activate these dormant data.

4.4 Adjustment of Graduate Education Management and Evaluation Methods

The application of big data technology in education and teaching management is an effective way to speed up the modernization of China's higher education. In recent years, universities have invested in the construction of graduate education management system, and the developed system greatly promotes the daily education and management of graduate students. However, the function of most teaching management systems is very single, which is far from enough to effectively use education big data. In order to avoid the waste of repeated investment, we can also expand the functions of the current graduate teaching management platform. If possible, the system can slowly collect and analyze all kinds of materials used by graduate students in the process of education, analyze the teaching effect, and analyze the teaching effect. According to the collected data, we can provide reference and suggestions for graduate students, relevant teachers and teaching administrators.

5. Conclusions

In the innovation research of graduate educational administration management mode under the background of big data, this paper makes an in-depth research and investigation on the main problems existing in the current university graduate educational administration management mode. And through the analysis of the results of the survey, this paper believes that at present, China's graduate education management still mainly adopts the traditional management mode, the degree of informatization is not high, and the data is not paid enough attention to, which leads to the poor management effect and poor communication between teachers and students. And this paper puts forward the graduate educational administration management mode based on big data technology, to a certain extent; it makes up for the shortcomings of the traditional graduate educational administration management mode. In this paper, the optimization and improvement mode mainly targeted to the traditional management mode of data mining and data management capabilities are improved. Through the improved management mode, the ability of graduate educational administration management is further enhanced. Especially in the integration of network resources, the ability to improve significantly and fundamentally changed the previous teaching philosophy, the relationship between teachers and students has become more harmonious, and communication has become smoother. The analysis shows that big data technology provides a technical basis for the reform of the educational administration of graduate students in Colleges and universities, and the research in this paper has also achieved ideal results, making contributions to the research of big data technology in the field of graduate educational administration management.

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