Transformation of Higher Education Management Mode and Coping Strategies Based on Big Data

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Abstract. Using data technology to optimize and reform teaching field is a part of teaching. Some schools have optimized the education mode, but there are many problems due to the lack of experience in this field. Therefore, this paper puts forward the transformation management mode and coping strategies. The main significance of university education management and the main problems existing, investigated and analyzed, and specific and improvement measures can be put forward according to the current deficiencies. The accuracy of data analysis is improved by optimizing factor analysis algorithm and simplifying steps. Puts forward the coping strategies of College Students' management in the era of big data, uses big data platform, formulates personalized student training plan, and attaches importance to the application of flexible management and other strategies. According to the survey results, since the adoption management mode, have greatly improved in the way of event handling and management information communication.

Keywords: Big Data Technology, Education Management, Smart Campus, Information Management

1. Introduction
The change of lifestyle stimulates the change of thinking mode, and then combines modern elements, and promotes the birth of information-based education management mode innovation [1-2]. This is the comprehensive in university, and also a milestone in the transformation from traditional mode to modern mode [3-5].

Under the new situation, the realization of educational management function in Colleges and universities require not only professional management methods and operating procedures, but also modern management skills [6-7]. Education management reflects the demand for big data thinking ability in the process of obtaining resources. Therefore, pay attention to the interaction between big data thinking practice of education managers and information-based education management mode [8-10].

To sum up, there are still many deficiencies. Especially after entering, there are some typical problems such as empiricism and formalism, the lack of data recognition ability and so on. Therefore, I hope to optimize and improve the existing model. This paper presents a specific optimization scheme, including the optimization of factor analysis algorithm, which simplifies the calculation steps and
improves the calculation accuracy. And put forward the era of big data, the development of personalized student training plan, put forward the big data era of student education program, and pays attention to the application of flexible management and other strategies. The analysis shows that through the improvement strategy of this paper, we can better improve the current mode of education management in Colleges and universities, and improve the degree of modernization of education management.

2. Big Data and University Education Management

2.1. An Overview of Education Management in Colleges and Universities

The content of educational resources is multifaceted, including not only human and material resources and funds, but also information resources. The traditional management mode has a strong management tool orientation, that is to say, it is oriented by management objectives and ignores the rationality of management means. However, from the perspective of management, the goal of university education management should be divided into two parts: hard target and soft target. Hard goals refer to the expectations of education, including the employment rate of students, students' achievements and other indicators that can be directly reflected. Soft goal refers to the educational value expectation, including the value orientation of students and other indicators that are difficult to be reflected by intuitive data.

2.2. Smart University

Educational administration management system, network teaching platform, student management system and other aspects of the popularization, university teaching management, education work and other services have been very convenient. These management systems collect a lot of information, and combine them, the content is very comprehensive. In this information, more is the information of students, mainly including their own basic information, as well as the dynamic of school life and so on. It also includes information related to teachers, teaching plans, course materials and other teaching information, as well as teaching materials for participating in scientific research activities. In addition, the comprehensive management information of the school also includes some information about classroom use, laboratory, employment recommendation, etc. This software will produce huge data in use, which is stored in different software systems. These data are very useful, but they are not well developed and cannot be fully developed and applied. Therefore, through the integration and management, this paper finds out the shortcomings of information education management mode.

3. Significance of the Transformation of Big Data Era on the Management Mode of College Students' Education, as well as the Main Existing Problems

Also to the mass data group collected from the source. From the current perspective of College Students' education management, the work mode and its needs of public education resources management will also change greatly. Only in this way can we keep up with the great progress of an era.

Table 1. The main significance and main problems of the transformation of big data age to the education management of colleges and Universities

| Main significance                                      |
|---------------------------------------------------------|
| 1. Deepening the reform of educational                 |
| 2. Promoting the modernization of educational management|
| 3. Establishing the subject status of students’         |
| 4. Promoting the development of Higher Education        |

| Main issues                                                    |
|---------------------------------------------------------------|
| 1. Empiricism and formalism are serious                       |
| 2. Lack of data analysis ability                              |
| 3. It is difficult to realize personalized management         |
| 4. There are great differences between theory and practice    |
The management system of University, analyze the effective management mode of the current management system in order to implement it. Although has played a perfect role in the education management. Therefore, this paper summarizes the main significance and main problems of the transformation age, as shown in Table 1.

4. Discussion

4.1. Comparative Analysis of Big Data University Education Management Mode and Traditional University Education Management Mode

With the continuous development, the educational management mode of many colleges and universities has undergone qualitative changes. The two extremes form two unchanging management modes, so this paper aims to verify the difference between big data university model and traditional university. A and B colleges and universities have implemented the big data computing education mode management for one year, which is representative.

This study mainly compares and analyzes the university mode technology and the traditional university education management mode from six indicators: event handling mode (C), management information communication mode (D), evaluation method of students (E), actual education mode (F), communication management mode (G) and evaluation management mode (K). From the evaluation results of Figure 1 and Figure 2, it can be seen that the university education management mode adopting big data technology is at the leading level in all scores traditional university education management mode. A and B two universities show the same trend.

Figure 1. Index analysis of big data university education management mode and traditional education management mode -- University A

Figure 2. Index analysis of big data university education management mode and traditional education management mode -- University B

4.2. Factor Analysis
Let \( x_1, x_2, x_3, \ldots, x_p \) be the original \( p \) variables, and the mean value of the variables is 0 and the difference is 1.

\[
\begin{align*}
    x_1 &= b_{11}f_1 + b_{12}f_2 + \cdots + b_{1p}f_p + \gamma_1 \\
    x_2 &= b_{21}f_1 + b_{22}f_2 + \cdots + b_{2p}f_p + \gamma_2 \\
    \cdots \\
    x_p &= b_{p1}f_1 + b_{p2}f_2 + \cdots + b_{pp}f_p + \gamma_p \\
\end{align*}
\]

(1)

Variable variance, the common degree \( h_i^2 \) of variable \( x_i \) is defined as:

\[
h_i^2 = \sum_{j=1}^p a_{ij}^2
\]

(2)

Equation (2) shows that the common degree of variable \( x_i \) in row \( i \) matrix \( A \), and it is an important index to evaluate the information loss degree of variable \( x_i \).

The definition of factor variance contribution is as follows

\[
s_j^2 = \sum_{i=1}^n a_{ij}^2
\]

(3)

4.3. Countermeasures of College Students’ Education Management in the Era of Big Data

(1) Construction of big data education management carrier

It fully integrates of data resources of social organs, education departments, schools and other scattered units and departments, forming a platform for platform construction and data sharing.

(2) Education management method based on big data

Using the method of data mining, studies the modeling and analysis, and studies management mechanism and scientific prevention, process control, tracking feedback, evaluation and incentive.

(3) Form a situation of data sharing and collaborative development

In order to effectively promote the fair sharing of social data, big data should not only be regarded as monopoly by a small number of individuals, but also be the big data that can be shared by all through other legal and regulatory channels.

4.4. Making use of Big Data Platform to Develop Personalized Student Training Plan

We can see from of education management mode that the current education sector constantly encourages, so as to improve their independent innovation ability. In addition, universities can effectively classify and process the required information resources by using big data, and create a network data service platform for easy utilization.

4.5. Pay Attention to the Application of Flexible Management Strategy

Pay attention to students' personalized thinking, consider the different needs of students, and formulate management strategies according to the needs of students in study and life. For example, through online teaching platform. The teaching management of professional courses has also changed into a mode. Students upload their learning achievements to the learning platform, which are reviewed and evaluated by teachers. The change of teaching mode and teaching evaluation mode adapts thinking and behavior consciousness, and applies new management concepts and methods.

5. Conclusions

Deeply studies the advantages and disadvantages of China's university education management mode, especially reform of university education management under the transformation. The analysis shows that formalism, insufficient ability of data analysis, and different theory and practice exist. The optimization and improvement strategies proposed in this paper, to a certain extent, make up for the
shortcomings of the current college education management information reform. According to the relevant survey conducted in this paper, since colleges and universities have adopted the education management mode established by big data technology, it has effectively improved the ability of event handling mode and management information communication mode. How to make good use of big data technology in university education management has become a difficult problem to test the ability of reform and innovation in Colleges and universities. We need to abandon formalism and increase research more pragmatically.

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