Assessment Mechanism of Class Construction in Colleges and Universities Based on Big Data Technology

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Keywords: Big Data Technology; SWOT Quantitative Strategic Matrix; College Class Assessment System; Digital Campus; College Class Assessment Index State Model.

Abstract: With the rapid development of large data technology, large data related applications have penetrated every corner of people's lives. The world is not producing a large amount of data at any time. At the same time, effective and reasonable processing of these massive data has become the key to the application of large data technology. Thanks to the development of big data technology, the concept of digital campus has been further promoted and realized. Through the analysis of a large number of data generated by college students' daily life, the effective management of college students can be realized and the better development of the school can be promoted. This paper will analyze and study the class assessment system of university based on big data technology and formulate the weight of the evaluation index of the construction of class style of study in university. Finally, this paper will establish the state model of the evaluation index of the construction of class style of study in university based on SWOT quantitative strategy matrix, so as to help university managers to clarify the specific distribution of the evaluation index of class construction. In order to improve the pertinence, scientificity and effectiveness of University work.

1. Introduction

The arrival of the information society has led to the rapid development of physical network and Internet technology, and the development of such technology has made the world produce a large amount of data all the time [1, 2]. The development and progress of big data technology has solved the problem of data processing in human society to some extent. Based on the above advantages, big data technology is widely used in all aspects of human life, especially in the education level. The concept of digital campus is a model of big data application [3, 4]. The application of big data technology solves the problems existing in the traditional class management mechanism of colleges and universities, such as inefficient management, unreasonable level of management system and assessment system [5, 6]. However, there are still many drawbacks in the application of big data technology in the assessment system of colleges and universities. The corresponding algorithm can not achieve more intuitive data analysis and can not give corresponding suggestions.

Based on the above problems, a large number of scholars and research institutions have carried out research and Analysis on it. Their main research direction is focused on how to use big data technology to optimize the efficient class management system. American colleges and universities [7] first used the big data of college students to assist in the analysis of college class assessment. According to relevant literature queries, the data stored in the database of the United States Department of Education Information System developed in a blowout. Chinese colleges and universities [8, 9] have begun to use the big data analysis to realize the distribution of freshmen dormitories, which makes great use of it. Data technology combines students with the same interests and similar living time, and assigns them to the corresponding dormitories, so as to solve the dormitory problem more efficiently. Universities in Europe adopt machine learning algorithm and big data technology to carry out the daily management of schools, aiming at students [10]. The individualized management mechanism is formulated according to the individual needs, so as to
stimulate students' interest and energy in learning.

In order to further rationally and efficiently use big data technology to realize the effective implementation of the university class assessment system, this paper will analyze the university class assessment system based on big data technology and formulate the weight of the evaluation index of the university class learning style construction. Finally, this paper will establish the university class learning style construction assessment based on SWOT quantitative strategic matrix. Indicator state model can help university managers to clarify the specific distribution of assessment indicators for class construction, so as to improve the pertinence, scientificity and effectiveness of University work.

The structure of this paper is as follows:

The second section of this paper will specifically analyze the current application of big data technology in university assessment system.

In the third section of this paper, we will study the relationship between College Students' attendance and examination results based on big data technology, and analyze the data based on a specific case. At the same time, we will give the corresponding model of college class assessment mechanism.

Finally, I will make a summary of this paper.

2. Application of Big Data Technology in College Assessment System

At present, the application of big data technology in the assessment mechanism of colleges and universities is mainly embodied in three levels, which correspond to the application of big data technology in school teaching, in school management and in school evaluation.

2.1. Application in School Teaching

In the school management department, the school gradually began to adopt machine learning algorithm and big data technology to carry out management work. Its main manifestation is that big data technology makes the management of schools more targeted, can better take care of the mainstream needs of students, and thus stimulate students' interest and energy in learning. However, the application of big data technology in school teaching is relatively confused, there is no unified standard, and the relevant association rules are relatively vague.

2.2. Application in School Management

In this regard, schools use big data technology to accurately count and screen the relevant student data, and carry out scientific management and use to promote their own management work towards a modern management model. At present, school administrators mainly use relevant student data for detailed and in-depth analysis, and then get accurate evaluation and prediction, so as to achieve scientific and reasonable guidance and suggestions for students. At the same time, managers will use big data analysis to discover problems and situations in the process of students' growth in time, so as to solve problems in time. However, at the level of data management, schools lack a relatively unified and standardized model, and there are still inefficient problems when implementing data management on campus.

2.3. Application in School Evaluation

Big data technology is also used in school evaluation. The most scientific and reasonable evaluation index can be obtained by big data analysis, and then a huge database can be built based on the data generated. According to the established database, the corresponding evaluation model is formulated, and the data analysis is used to mine the database in depth. The data needed by the school is analyzed and presented accurately, and a reasonable interpretation is made. However, the current school evaluation system is similar to the school management system, and there are still unreasonable models.
3. Assessment Model of College Class Construction Based on Big Data Technology

The relevant indicators are as follows:

X: Independent variables, including management system, daily behavior, quality development and academic planning

Y: Dependent variables, employment rate, graduate education rate and contract rate

B: Coefficient of correlation

E: Constant term

In this paper, the basic data for modeling are as follows. The corresponding data block diagram is shown in Figure 1.

![Figure 1. Block diagram of basic data sources for modeling of university class assessment system based on big data technology](image)

This paper mainly uses the employment quality to match the assessment system when establishing the assessment model of University classes. It mainly includes the following links in the modeling: parameter estimation, goodness of fit, significance test and model diagnosis.

The relationship between class management assessment and employment can be expressed by matrix model, and the corresponding model expression is shown in Figure 1.

\[
X = \begin{bmatrix}
1 & x_{12} & \ldots & x_{1n} \\
1 & x_{22} & \ldots & x_{2n} \\
\vdots & \vdots & \ddots & \vdots \\
1 & x_{n2} & \ldots & x_{nn}
\end{bmatrix}
\]  

At the level of parameter estimation, the linear regression model is used to deal with it. The regression linear model expression between the relevant efficient assessment system and the quality of employment is as follows: Formula 2:

\[
X = B_0 + B_1 x_1 + B_2 x_2 + \ldots + B_n x_n + E
\]  

In the optimization of fitting degree, the regression linear model between efficient assessment system and employment quality is fitted. The corresponding expressions are as follows 3.

\[
X = \tilde{B}_0 + \tilde{B}_1 x_1 + \tilde{B}_2 x_2 + \ldots + \tilde{B}_n x_n + E
\]  

In the aspect of saliency experiment, the construction statistics F is processed based on the model after fitting. The corresponding constructed statistics F is shown in formula 4 below.
At the level of model diagnosis, residual analysis, impact analysis and multi-collinearity analysis are mainly carried out. The most important index of multi-collinearity analysis is the condition number of matrix.

$$F = \frac{ESS / n}{RSS / (m - n - 1)} = \frac{\sum_{i=1}^{n} E_i^2 / (m - n - 1)}{F(n, m - n - 1)} = \frac{\sum_{i=1}^{n} E_i^2 / (m - n - 1)}{F(n, m - n - 1)}$$  \hspace{1cm} (4)

In order to further verify the validity of the relevant model proposed in this paper, based on the basic data sources of the above figure 1, about 600 college students were selected for the experimental test, mainly using the questionnaire survey method and linear regression analysis of the results of the questionnaire survey. The correlation analysis Table of the corresponding class assessment indicators is shown in Table 1.

<table>
<thead>
<tr>
<th>Institution management</th>
<th>Daily behavior</th>
<th>Rate of employment</th>
<th>Graduate Study Rate</th>
<th>Contracting rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td>-3.21</td>
<td>0.463</td>
<td>-0.17</td>
</tr>
<tr>
<td>2</td>
<td>0.879</td>
<td>0.590</td>
<td>-3.45</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>0.887</td>
<td>-2.90</td>
<td>0.436</td>
<td>-0.051</td>
</tr>
<tr>
<td>4</td>
<td>0.737</td>
<td>0.081</td>
<td>0.412</td>
<td>0.038</td>
</tr>
<tr>
<td>5</td>
<td>0.0579</td>
<td>0.006</td>
<td>0.001</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>0.879</td>
<td>-4.28</td>
<td>0.590</td>
<td>-3.45</td>
</tr>
<tr>
<td>7</td>
<td>0.887</td>
<td>0.081</td>
<td>0.436</td>
<td>-0.051</td>
</tr>
<tr>
<td>8</td>
<td>0.637</td>
<td>0.081</td>
<td>0.412</td>
<td>0.038</td>
</tr>
<tr>
<td>9</td>
<td>0.479</td>
<td>-4.28</td>
<td>0.590</td>
<td>-3.45</td>
</tr>
<tr>
<td>10</td>
<td>0.687</td>
<td>-2.90</td>
<td>0.436</td>
<td>-0.051</td>
</tr>
<tr>
<td>11</td>
<td>0.637</td>
<td>0.081</td>
<td>0.412</td>
<td>0.038</td>
</tr>
</tbody>
</table>

The corresponding fitness curve is shown in Figure 2 below.

![Fitness curve](image)

Figure 2. Fitting index curve between student employment rate and college management assessment system

The corresponding linear fitting curve is shown in Fig. 3.
Figure 3. Linear fitting diagram between student employment rate and college management assessment system

From the figure, we can see that the model proposed in this paper has strong practicability, which can well reflect the relationship between university management system and student employment rate.

4. Conclusion

The rapid development of big data technology makes the assessment system of university class management more intelligent and digitized, and also improves the efficiency of University management, which reflects the rationality of university management assessment. Based on the big data technology, this paper analyses and studies the class assessment system in Colleges and universities, and formulates the weight of the evaluation index for the construction of class style of study in Colleges and universities. Finally, this paper establishes a state model of the evaluation index for the construction of class style of study in Colleges and Universities Based on SWOT quantitative strategy matrix, which helps university administrators to clarify the specific distribution of the evaluation index for class construction. The situation improves the pertinence, scientificity and effectiveness of the work in Colleges and universities.

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