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Analysis of the Application Value of Campus Card Data in Colleges and Universities: An Example of Precise Financial Aid for Poor Students

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Abstract: *Big data in colleges and universities is generated during the whole process of college activities and collected according to the educational needs. Mining and utilize the potential huge value of data to support the informatization development of colleges and universities has become an inevitable trend in the future strategy. This paper takes financial aid for poor college students as an example to analyze the application value of campus card data in colleges and universities, and specifically introduces how to use big data processing technology to fully mine the campus card data and discover the hidden value behind it, which can not only realize the accurate identification of poor college students and provide precise financial aid but also greatly protect students' self-esteem, let students feel the school's attention and care for themselves.*

Keywords: *Big data, Campus card data, Poor college students, Accurate identification, Financial aid*

1. Introduction

Big Data has affected the development of all walks of life in society and brought opportunities for the development of education informatization. Big data in colleges and universities is generated during the whole process of college activities and collected according to the educational needs. How to use data collection, analysis, calculation and mining to support the informatization development of colleges and universities has become an inevitable trend of future strategies.

The concept of "precise financial aid" has further promoted the development of financial aid work in colleges and universities. The era of big data provides a new opportunity for the development of precise financial aid work. Making full use of big data technology to improve the accuracy of identification of poor students, build a complete funding data platform, establish a complete system, strengthen the education function of financial aid, and promote the construction of a funding system for poor students. Big data technology provides new ideas and methods for the financial aid work, which helps to promote the standardization and scientificization of financial aid work for poor students in colleges and universities[1].

Campus card system produces a large number of data every day, if these data can be effectively sorted out, mined and analyzed, and then find the hidden value behind it, it can provide decision support for the development of colleges and universities, and provide more refined and personalized services. Precise financial aid has become an important work of the country at present. For universities, it is difficult to identify the real poor students. According to the existing list of poor students, the students are divided into two categories of statistical consumption characteristics by analyzing the campus card consumption data, analyzing the correlation between the consumption times and consumption funds, studying the consumption view of poor students and predicting consumption characteristics[2].

2. Construction Status

Through the information construction of our university in recent years, the digital campus construction and basic information facilities are relatively perfect. It includes three major platforms of digital campus, campus card system, access control system, library management system, campus wired network and other systems, and various business systems such as educational administration system,

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academic engineering system, employment system, etc. Combined with the basis of information technology, our university's educational technology is also constantly optimized and developed, including the distance education platform and network teaching platform, so the university is rich in various data.

Our campus card consumption function has covered the application scenarios of various restaurants, supermarkets and commuter buses on campus. The system provides diversified payment channels and supports multi-consumption media payment. At present, our campus card is divided into two types: physical card and electronic campus card. The physical card and electronic campus card share the same fund account. Campus card users can use the electronic campus card after real-name authentication through the WeChat public account or Alipay life account. In addition to using the physical campus card and the electronic campus card, users can also directly use WeChat and Alipay to consume on campus.

Since the payment information of WeChat or Alipay is associated with campus card system through the process of user's real-name authentication, the system will record this part of consumption data. Therefore, our campus card system has recorded a complete set of students' consumption data, which can help improve the construction of big data and help to improve the scientific management.

For colleges and universities, there is no uniform standard for identifying poor students. Nowadays, the method of self-declaration is generally adopted. Some students do not report even if they are in financial difficulties due to factors such as self-esteem. Some families can issue poverty certificates even if they are not poor. The current method has some drawbacks, with more subjective basis and less objective basis. Therefore, how to ensure that the real poor students enjoy the support and assistance of the state will not only affect the progress of the poor student himself, but also affect his family, the fairness of China's higher education and the harmonious and stable development of the whole society[3].

3. Intelligent decision making for precise financial support for poor students

3.1. Construction Objective

The construction process is shown in Figure 1.

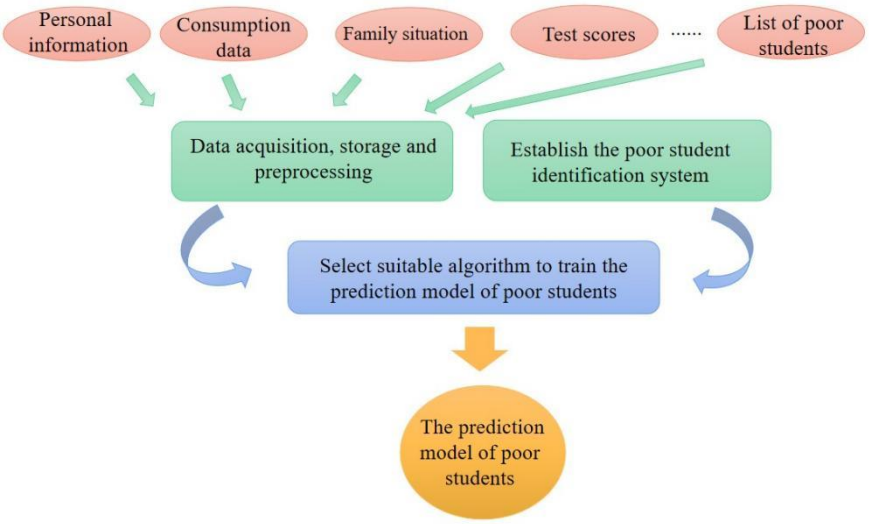

Figure 1: The construction process

Based on students' consumption data, personal information, family situation and so all, we can track students' life in school in real time, and analyze whether there are students who are suspected to be poor among those who have not received grants, and whether there are students who do not meet the criteria of poor students among those who have received grants. Through the big data analysis and judgment, we can give intuitive and visual data display, which can reduce the work pressure and provide work efficiency for the relevant staff, and distribute the grants more accurately.

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3.2. Construction process

Combining with the actual situation and development needs of the school, according to the construction specification of China Education Big Data, we collect the raw data such as campus card consumption data, basic information of students, awards and subsidies obtained during school, participation in social practice activities, basic family situation, to find out the different consumption behavior characteristics between poor students and non-poor students and the hidden rules. Firstly, the data is acquired and preprocessed. Calculate the consumption of each student from the database, such as the total number of monthly consumption, the average consumption of three meals, etc. According to the list given by relevant departments, students are divided into poor students and non-poor students, and their consumption characteristics are counted. Please refer to Figure 2.

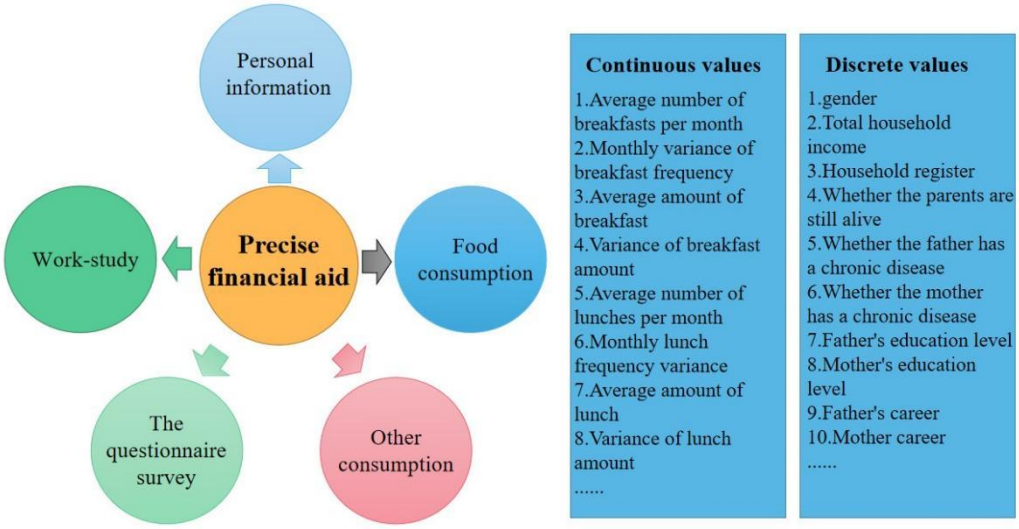

Figure 2: Collect different types of data

In addition, we need to conduct statistics and analysis on the existing poor students, learn more about the life trajectory of this group of people, and accurately grasp the degree of assistance to the poor students, then analyze what kind of assistance is the most effective and useful, and how to achieve precise financial aid.

Next, according to the university's business needs, a system for identifying poor students that meets the university's current situation is established. According to business data and business rules, the common machine learning algorithms including cluster analysis, classification algorithm, frequency correlation analysis and recommendation system are selected to design the auxiliary identification model to find the abnormal poor students, so as to achieve accurate identification and precise financial aid.

3.3. Construction Content

The family situation of each poor student varies, and different students should be applied to different means of financial assistance and help. Through data analysis, mining and other technical means, we will build a portrait of student’s financial aid needs to assist the staff of our financial aid center and counselors to carry out accurate identification and targeted assistance work.

Using the campus card consumption data, combined with the data mining means of meal category, consumption amount, consumption times, food and beverage consumption ratio and other dimensions, we identify students in need with high consumption frequency but low consumption amount, and provide several analysis modules such as characteristics analysis of poor students, portraits of poor students, unusual consumption of poor students, need portrait of poor students, to provide data support for accurate invisible funding.

3.3.1. Analysis of the characteristics of poor students

Based on students' various behavioral data during their school years, we use machine learning algorithms[4,5] to label students' behaviors and obtain high-frequency behavioral labels for poor students through observation. Such high-frequency labels can be used to assist in the verification and evaluation

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reference during the poverty assessment stage.

3.3.2. Portraits of poor students

Integrate the information of poor students and the comprehensive evaluation information of students, and establish a portrait of student financial assistance needs, including basic information of students, portrait labels, consumption record tracking, awards and assistance during school, participation in social practice activities, and basic family information. It provides data portraits of "thousands of people and thousands of faces". The portrait also provides statistics, trend analysis and comparative analysis of academic performance, consumption and activities in the second class. The financial aid center and counselors can use this function to track the growth of poor students after they get financial aid. They can discover and take intervention measures in time for fluctuations in grades and consumption changes after being assessed, so as to realize the whole-process management of the whole financial aid work.

3.3.3. Abnormal consumption warning for poor students

Based on the academic warning data of our university in the teaching link, the result data of academic warning can be matched with the poor students, so as to obtain the academic warning situation of poor groups, and timely intervention and support measures can be taken for the academic warning behavior after receiving financial aid.

3.3.4. Invisible financial aid based on consumption data

Based on the historical meal rate statistics of our school, the average daily meal rate of the whole school is above 65% for breakfast per month and above 80% for lunch and dinner per month. Considering that the large amount of consumption expenditure of students from poor families will be in the area of meals, the system uses indicators such as month, meal percentage and number of meals for each meal as screening conditions and adjusts different thresholds for screening poor students. After a comprehensive analysis of the identified students with high dining rate and low consumption combined with the portraits of the needs of poor students, the students with poor families and good academic performance are granted living allowance through the campus card, which eliminates the student application process and reflects our university's care for students in special groups.

4. Conclusions

This paper uses technical means and data such as consumption of campus cards to accurately identify students with difficulties, and actively cares and helps students in need by disbursing invisible grants. It can not only achieve precise financial support and greatly protect students' self-esteem, but also allow students to perceive the school's concern and care for them. This is just a practice of using campus card data to assist school management. The campus card data has various types and is connected with multiple access control systems on campus. Later on, the user's behavior trajectory and main contact persons on campus can be drawn through the campus card consumption and access control data, so as to provide decision support for school epidemic prevention headquarters.

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