

# Analysis of Student Management Work of College Counselors Based on Big Data Technology

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**Abstract:** In the management of college students, big data technology can help counselors effectively manage and evaluate students, while monitoring their progress and development potential. This is of great significance for improving students' comprehensive quality and personalized development. Based on this background, this article explains the changes that have occurred in the student management work of university counselors under big data technology, and proposes work strategies from four aspects: building information systems, data mining, differentiated services, and data privacy protection. By utilizing the advantages of big data technology, the effectiveness and long-term effectiveness of university management and education are enhanced.

**Keywords:** Big Data Technology; College Counselors; Student Management; Work Strategy

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Big data technology is a method of analyzing and processing massive amounts of data using methods such as data mining and machine learning. The application of big data technology in university student management can not only improve the quality and efficiency of university student management work, but also promote the reform and innovation of university management and education.

## 1. Changes in Student Management of College Counselors under Big Data Technology

### 1.1 Data Collection and Integration

Counselors can use big data technology to collect and integrate various information related to students, including academic performance, course selection, interests, social networks, psychological status, etc. This information can help counselors comprehensively understand the characteristics and needs of students, and provide more accurate and personalized guidance and services for students.<sup>[1]</sup>

### 1.2 Data Analysis and Mining

Counselors can use big data technology to analyze and mine the collected student information, and discover the potential patterns and values of students. For example, counselors can identify students' strengths and weaknesses, discover their potential and interests, predict their development direction and career planning through data analysis. This information can help counselors develop more reasonable and effective education plans and management strategies<sup>[2]</sup>.

### 1.3 Data Application and Feedback

Counselors can use big data technology to apply the analyzed and mined information to student management work, achieving data-driven educational management. For example, counselors can provide students with customized learning plans, course recommendations, career counseling, etc. based on data results.

## 2. Strategies for Student Management of College Counselors under Two Big Data Technologies

### 2.1 Establishing and Improving an Intelligent Student Management Information System

Using big data technology, build an information system that covers all aspects of students, including their basic information, learning situation, behavioral characteristics, psychological status, etc. By collecting, storing, analyzing, and displaying this information, we provide a comprehensive, accurate, and real-time student management platform for counselors. For example, building a student integrity information management system based on blockchain technology<sup>[3]</sup>. This system can record and verify

students' integrity behaviors, such as cheating in exams, plagiarizing papers, violating school rules, etc., and store this information on the blockchain to ensure the security and non tampering of data. This system can help counselors supervise and evaluate students' integrity status, improve their awareness and literacy of integrity. Build a student performance information management system based on data mining and machine learning. This system can analyze and mine students' performance information, identify their strengths and weaknesses, predict their development direction and career planning, and display this information to different groups such as teachers, students, and teaching supervisors in a user-friendly interface. This system can help counselors develop more reasonable and effective education plans and management strategies, improve students' learning outcomes and quality. Build a student behavior feature information management system based on cloud computing and the Internet of Things <sup>[4]</sup>. The system can collect and integrate behavioral characteristic information related to students through various sensors and devices, and upload this information to the cloud for analysis and processing. This system can help counselors comprehensively understand the characteristics and needs of students, and provide more accurate and personalized guidance and services for students.

## **2.2 Using methods such as data mining and machine learning to classify and predict students**

Data mining and machine learning are methods that utilize mathematical and statistical methods to analyze and process massive amounts of data. The application of data mining and machine learning in the field of education can promote educational reform and innovation. In universities, data mining and machine learning can help counselors effectively classify and predict students, while monitoring their progress and development potential. This is of great significance for improving students' comprehensive quality and personalized development. Under data mining and machine learning, examples of college counselors classifying and predicting students can include the following.

First, use decision tree, random forest, naive Bayes and other classification algorithms to analyze and predict students' performance information. Divide students into different groups or individuals based on their different characteristics and needs, and develop corresponding management goals and measures for each group or individual. Secondly, use data mining techniques such as clustering and association rules to analyze and mine students' behavioral feature information. Discover the potential patterns and values of students, identify their strengths and weaknesses, discover their potential and interests, predict their development direction and career plans, and present this information to different groups such as teachers, students, and teaching supervisors in a user-friendly interface. Utilize data mining technology to provide differentiated and personalized management services for different types of students, including learning guidance, course recommendations, career planning, psychological counseling, etc.

## **2.3 Implementing differentiated and personalized student management services**

Implement differentiated and personalized student management services. Based on data analysis and prediction results, provide differentiated and personalized management services for different types of students, including learning guidance, course recommendations, career planning, psychological counseling, etc. <sup>[5]</sup>. For example, for students with excellent grades, broad interests, strong abilities, clear career goals, and the need for more challenges and innovation, teachers can recommend some challenging courses and projects to encourage them to participate in various competitions and activities, and cultivate their innovation and leadership abilities. At the same time, some industry experts and outstanding alumni can also be invited to provide career guidance and consultation to help them achieve their career goals. For students with good grades, average interests, moderate abilities, vague career goals, and the need for more guidance and encouragement. Teachers can recommend courses and projects that are suitable for their level and interests, guide them to expand their knowledge and vision, and improve their confidence and autonomy. Regularly communicate and provide feedback to them, understand their learning situation and confusion, and provide them with appropriate advice and encouragement. For students with average grades, single interests, weak abilities, lack career goals, and need more help and support, teachers can recommend some basic and practical courses and projects to help them consolidate their basic knowledge and skills, improve their learning effectiveness and quality. For students with poor grades, lack of interest, low abilities, negative career beliefs, and the need for more intervention and correction. The teacher can recommend some compulsory and remedial courses and projects for them, requiring them to complete homework and exams seriously, and improving their sense of learning responsibility and discipline. At the same time, they can also carry out some psychological test and counseling, analyze their psychological problems and causes, and give them appropriate correction and guidance.

## **2.4 Strengthen data security and privacy protection**

When using big data technology for student management work, attention should be paid to protecting students' data security and privacy rights. For example, data desensitization: replace, mask, encrypt and other operations on the student's name, ID number,

mobile phone number and other information. Data desensitization can be carried out in various stages of data collection, storage, transmission, and analysis to prevent data leakage or malicious exploitation. Anonymization of data: grouping, aggregating, and perturbing information such as students' gender, age, and grades. Data anonymization can be carried out during data analysis and publication to prevent data from being re identified or inferred from the original information. Homomorphic encryption: it can make the encrypted data still keep the structure and characteristics of the original data, and can perform various operations on the encrypted data, and the result is the same as the result of encryption after the same operation on the original data. Homomorphic encryption can be performed in the link of data transmission and calculation to prevent data from being stolen or tampered with during transmission, or being spied or disclosed by a third party during calculation.

### **3. Conclusion**

In summary, under big data technology, the student management work of university counselors has undergone significant changes. These changes not only enhance the management level and ability of counselors, but also enhance the effectiveness and long-term effectiveness of university management and education, and at the same time improve the satisfaction of university students with education. Big data technology has provided new ideas and methods for the student management work of university counselors, as well as new opportunities and challenges for university education reform and innovation.

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