Research on the Framework of Precision Education Model in Universities Based on Big Data Technology

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Abstract. The era of big data in education has come, data-driven intelligent decision-making has become the development trend of the era of big data. The requirements for the subdivision of education are constantly strengthened, and students prefer to get accurately connected educational courses and practical training. Colleges and universities need to use the existing teaching resources and teacher resources to subdivide the needs of students, and further establish a curriculum and education model in line with the needs of students and personalized characteristics and advantages. Nowadays, precision and personalization have become the key words of education and teaching in the era of big data. This article uses python to search, and uses CiteSpace to define the concept of precision education and analyze and summarize the related literature. Then the article analyzes the application of education big data in precision education, and finally build the overall structure of the precision education big data analysis platform.

Keywords. Precision education; big data technology; personalized education service.

1. Introduction
This article takes precision education in colleges and universities as the research object. The term “precision education” does not have a clear definition and concept in China, and it usually expresses the meaning of “teaching students in accordance with their aptitude” together with “individualized education” [1]. The “precision education in colleges and universities” in this article can be defined as a differentiated teaching based on the actual situation and individual differences of students in higher education, so that each student can make best use of their strengths and avoid weaknesses to obtain the best development. It includes not only the teaching of scientific and cultural knowledge to students (precision teaching), but also the guidance of students’ professional practical ability and the cultivation of ideological and moral qualities.

The precision education in colleges and universities driven by big data is to rely on the support of information technology and big data analysis technology [2]. Through the analysis and mining of basic information data, learning behavior data, etc. of college students, the personalized characteristics of students are characterized, and to promote learning, enhance professional ability, and improve Ideological training is the goal, and targeted and precise education programs are given according to the individual characteristics of students.

2. Literature Research
With the help of python, the China Knowledge Network Database (CNKI) is used as the data retrieval source, and the data is collected through the “advanced retrieval” module in the “journal retrieval”.
Domestic scholars have lately studied precision education in colleges and universities. As shown in figure 1, starting from 2014, as of 2021, a total of 28 academic papers have been published.

![Figure 1](image1)

**Figure 1.** The number and time distribution of research results on precision education by scholars inside and outside the province.

This study uses CiteSpace to visually analyze 28 documents. From the keyword co-occurrence map, which is shown in figure 2, it can be reflected that the current scholars’ research on precision education is mainly concentrated in 4 areas: ideological and political precision education research; precision education theoretical research; precision education objects Research; content research of precision education.

![Figure 2](image2)

**Figure 2.** Keyword map of precision education research by scholars inside and outside the province.

The main scholars and their main opinions are shown in table 1.

### 3. Construction of Precision Teaching Mode under Big Data Technology

In educational practice, students have different qualifications, cognitive levels, learning styles, and learning motivations; different students have different responses to educational programs; and the educational effects produced are also different. At present, the most common form of teaching organization in college education-collective teaching usually adopts the same teaching plan for all students. It is difficult to pay enough attention to the individual differences of students, which is not conducive to the maximum development of students and the further improvement of teaching effects.

Educational big data makes all kinds of educational information such as student behavior, learning status, and learning results into a digital existence that can be captured, quantified, and transmitted, which makes accurate education measurement data more accurate and feasible. Through data analysis of student characteristics and behavioral performance, precision education focuses on the
relationship between education and individual students, and can tailor more effective education methods and improvement measures for individual students. The emphasis is on personalized education. The supporting point of different people’s knowledge acquisition in general education.

| Research direction                        | The main points                                                                                                                                                                                                 |
|------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ideological and political precision education research | In-depth analysis of ideological and political network-based precision education for college students is provided to provide a reference for the efficiency of ideological and political education in colleges and universities [3]. It is proposed to combine theory and practice in ideological and political education for college students, based on ledger management, and innovate ideological and political education based on precision education [4]. In view of the problems in the education of party members of middle school students in colleges and universities under the new situation, conduct analysis and research, and propose to improve the management team building, party member education system, and build a refined management platform for party members to achieve the construction of a precise education management system for party members. |
| Theoretical research on precision education | It is proposed that the core concept of precision education is to promote the development of students’ individual personality and coordinated development; it is proposed that precision education is an educational philosophy and behavior based on big data analysis. |
| Precision education content research      | Starting from the concept of precision education, the establishment of a three-tier public basic curriculum system for academic education, vocational training, and other types, and the establishment of public basic curriculum reforms from hierarchical arrangements, teaching objectives, teaching methods, assessment and evaluation, etc., have achieved good results. |
| Research on objects of precision education | Precision education for students with learning difficulties With the help of the government, every parent attaches great importance to family education. Teachers’ care, heart-to-heart, and learning assistance to students with learning difficulties; The effective path of the school and student “three-in-one” education model has a promoting effect on the realization of student precision education [5]. Through the implementation of the precision education model of “precisely identify the situation of college freshmen, and consciously help them to solve various adaptability problems, and form a complete enrollment education evaluation system”; Schools are proposed to break the class-based teaching system, and implement class-based teaching [6]. The administrative unit should divide the teaching group according to the characteristics of the students, and use the teaching group as the unit to teach. |

3.1. The Application of Education Big Data in Precision Education

In an era where data is increasingly valued, education big data (such as learning behavior data, academic data and student personalized data) has become the basis for accurate teaching [10]. Various educational information systems can collect real-time behavioral data (such as the time when the behavior occurs, how the behavior occurs, etc.) of the student's learning behavior, and use big data technology tools to track and record the process and results of the learning behavior, so as to facilitate the process. Data mining, analysis, application.
First of all, education big data can help teachers accurately match educational objects and lock educational goals, as shown in figure 3. Subsequently, teachers can accurately push educational content to educational objects and provide personalized educational services. Third, a large amount of behavior record data will be formed in the learning process of students. After uploading it to the big data analysis platform, students’ learning behavior can be finely quantified. Fourth, based on the data collected by the information platform, the teacher conducts a precise analysis of the student’s academic situation, and forms the results of academic ability evaluation and feedback. Finally, teachers make precise education decisions and intervention measures based on the evaluation results.

3.2. Construction of a Precision Education Analysis Platform Based on Big Data
With big data as the platform, the first is big data collection and processing, and big data crawlers are used for data mining for program design, algorithm implementation, and data cleaning; the second is big data storage, which uses a distributed file storage system to analyze from four dimensions, and store the analysis results; the third is the formation of big data algorithms, which are based on the distribution of modules of big data algorithms, and perform calculations based on distributed programming. Finally, a big data analysis model is constructed, and the overall architecture of the education big data analysis platform is constructed for the four dimensions of the analysis data, as shown in figure 4.

Figure 3. Big data precision education operation flow chart.

Figure 4. The overall architecture of the precision education big data analysis platform.
The first layer: data collection layer, the subject plans to build an online and offline integration of teaching big data collection mode: connect the port of the big data comprehensive analysis platform to the data port of the teaching management system and student management system; use web crawler collection technology, Network diary collection technology to obtain student individual behavior data; questionnaires, interviews and other methods to obtain offline data.

The second layer: data storage layer, to establish an analysis system based on student behavior, learning status, and learning achievement theme library.

The third layer: data analysis layer, this topic involves learner modeling, user profile, growth path planning, cluster analysis, etc.

The fourth layer: data application layer, college teachers and student management personnel conduct intelligent decision-making analysis, accurately match educational objects, and push educational content.

4. Conclusion
This paper analyzes the precision education issues in colleges and universities in the context of big data, combs the current academic literature on precision education, and conducts in-depth research on ideological and political precision education, precision education theory, precision education objects, and precision education content.

In the information age, it is necessary to use big data technology to fully mine information and transform it into valuable data to build the overall architecture of a precision education big data analysis platform. Research on the construction of a big data technology platform for precision education in the context of the digital information age is of great significance to promote the realization of precision teaching, personalized learning, intelligent education and intelligent management.

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