

The Research on Cloud Platform Construction of Mathematics Education Curriculum under big Data Background

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Abstract: Modern big data technology is developing rapidly. With the rapid development of the Internet, big data technology has a relatively mature application mode in many fields. Big data has provided new advantages for teaching reform and innovation with its massive information collection, analysis and processing advantages. Based on this, this paper focuses on the teaching reform of linear algebra course, explores how to use big data technology to achieve innovative breakthroughs in teaching reform, and combines some teaching examples for analysis.

1. Introduction

With the rapid development of computer network technology and modern communication technology, the concept of big data has attracted more and more people's attention, and it has become an important means to promote today's social management innovation and technological innovation [1]. Today, with the high level of information connectivity, big data can be used to analyze and mine a lot of useful information from massive data, and provide reference decision-making services for governments, scientific research institutions and other industries. At present, educational big data is also an inevitable trend of the current educational information construction in colleges and universities. However, in the face of big data environment, many colleges and universities have encountered many problems in the construction of digital campus, such as the mutual sharing of various information resources on campus, and the aggregation and regeneration of data resources. The development of cloud computing technology provides a new opportunity for the inter-communication mode of educational resources platform in colleges and universities [1]. As a derivative of the big data era, the educational resource cloud platform has many advantages, such as convenience, security and sharing, and the attention attracted of many universities.

2. The advantages of the educational resource cloud platform

2.1 Integrate resources to improve efficiency.

The educational resource cloud platform easily integrates high-quality educational resources of schools through cloud computing technology and reduces hardware costs. In addition, the educational resource cloud platform realizes the use of resources such as push, release, audit, and retrieval through simple and easy-to-use resource management software, effectively improving the utilization rate of cloud resources [2].

2.2 Integration of resource construction.

The educational resource cloud platform is a resource platform built on the core of cloud computing technology, effectively realizing the sharing and sharing of resources. Based on the management concept of cloud service, the use of technology advantages to integrate teaching, research, management, and office services, enabling campus collaborative office, single sign-on, multi-terminal access, network billing and other functions to effectively implement teaching and teaching [2]. It provides convenient conditions for the study of the course, and thus realizes the co-construction and sharing of resources in the true sense, as shown in Figure 1.

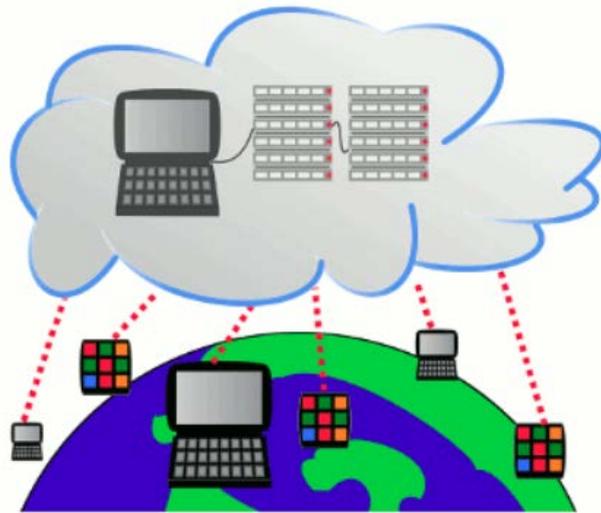


Fig. 1 Resource information sharing

2.3 Business expansion and technical security.

In the education resource cloud platform, technologies that need to be used include high-performance computing technology, virtualized cloud storage technology, multi-tenant technology, network teaching video technology, 3G technology, WAP technology, RFID technology, etc. These new technologies are not only beneficial to the future campus. Business expansion, but also has obvious advantages in the construction of smart campus, seamless connection of digital office [3]. In addition, the use of virtualized storage technology, easy to prevent hacker attacks, thereby improving the security of school data resources.

3. Problems in mathematics teaching in colleges and universities

3.1 The attention of college staff is insufficient.

College staff's understanding of mathematics teaching reform is obviously insufficient. It does not fundamentally recognize the importance of mathematics teaching reform to the school and the students' physical and mental development. The mathematics teaching reform is often dominated by extensive mode [3]. Especially in recent years, with the continuous deepening of the reform of the education system, colleges and universities have shown a rising momentum of rapid development. Colleges and universities need to strengthen the development and improvement of mathematics teaching reform to adapt to the needs of the times and social development. However, the staff of colleges and universities have neglected the construction of the mathematics teaching reform system. It is difficult to deal with the correctness, scientificity and formativeness of data and information. The education concept based on students is not effectively implemented in practical work. The lack of modern means of information, the mathematical teaching reform and the operational procedures of the feedback mechanism are difficult to match, making it difficult to fully play its true role in mathematics teaching reform [4].

3.2 The imbalance of internal mathematics teaching reform and development.

Due to the insufficient attention of college staff, the development of internal mathematics teaching reform is unbalanced. The construction of internal mathematics teaching reform by university staff focuses on the evaluation of educational tasks and objectives, lacks effective monitoring and control methods, and the intensity of supervision and control is not strong, making it difficult for reform and innovation to carry out and implement actively and effectively. [5]. The development of internal mathematics teaching reform needs to proceed from the actual situation of the school itself. However, in the actual work process, due to the unbalanced development of internal mathematics teaching

reform, the data and information collection work are more difficult. The educational goal formulation and data processing cycle are longer, greatly increasing the complexity of the work and the length of the process are difficult to form a professional and scientific internal mathematics teaching reform system [4].

4. The big data cloud platform brings changes to teaching

"Big data" teaching is the need of the times, the needs of education, the needs of teachers and students. The new curriculum materials require that modern education should be personalized and differentiated. Big data can promote the individualization of education. Technology is rapidly changing this era. Education should also be reformed with the times to cultivate the talents needed in the future. For the impact of the data age on teaching, I have the following views:

4.1 Teachers must change their mindset.

Data surveys show that regional performance with software-assisted instruction has improved. Traditional mathematics teaching can only introduce the situation through the teacher's explanation, which is rather boring and difficult to understand. After using multimedia teaching, students can directly experience the students from the visual point of view through pictures and videos, which makes it easier for students to understand [6]. For example, "the image and nature of the quadratic function", if the traditional teaching method is adopted, it is impossible to draw many images in a short time for the students to observe the characteristics, but the students can vividly view multiple images by using the PPT software teaching. , more intuitively summed up its nature.

4.2 Establish a reasonable course assessment system.

In traditional teaching, the teacher's problem preparation is balanced, all the students do the same problem, and the teacher cannot quickly summarize the student's problem. After using the software, you can do the level-by-level exercises. In the questions, the students who are all right in the basic questions can automatically push the puzzle to overcome. In addition, no full pair of students can automatically push the wrong questions and redo. Through the statistics of the data to explain the degree of understanding of 60% to 80%, and below 60% of the key explanations, which can greatly improve the efficiency of classroom teaching [6].

In traditional teaching, after each test, the teacher wants to correct and then analyze all the students' test papers, and the workload is very large. However, after using modern software, teachers can conduct a comprehensive online batch of students, and then through software screening, you can effectively analyze each test[5]. Accurate data analysis allows teachers to keep abreast of students' mastery of knowledge. For example, the overall answer to a single question for a 15-question student, such as the correct or incorrect question of a certain student, can be easily counted. Through these data, teachers can effectively carry out test papers and individual tutoring, which greatly improves the efficiency of teaching.

5. Design of mathematical cloud computing teaching platform

Functional module design. The mathematics cloud computing aided instructional platform is an integrated mathematics environment. The main operational objects in this environment are teachers, students and platform managers, and researchers who perform special scientific computing tasks. Therefore, the platform is divided into four subsystems, namely the teacher subsystem, the student subsystem, the scientific computing subsystem, and the manager subsystem; each subsystem is interconnected to achieve an overall mathematical teaching and learning environment [7]. The management subsystem is mainly responsible for the operation and management of the entire platform, including environmental management, platform configuration management, operational data management and security policy management, and management of information for teachers, students, and researchers. The teacher subsystem implements teacher course management, deployment tasks, online coaching, collaborative lesson preparation, assignment and processing, test

management, and student information management, as well as math modules [7]. The student subsystem implements functions such as online, collaborative communication, job processing, resource sharing, online testing, and experience sharing, as shown in Figure 2. The scientific computing subsystem provides researchers with big data processing and highly demanding mathematical calculation functions to achieve project computing task management.

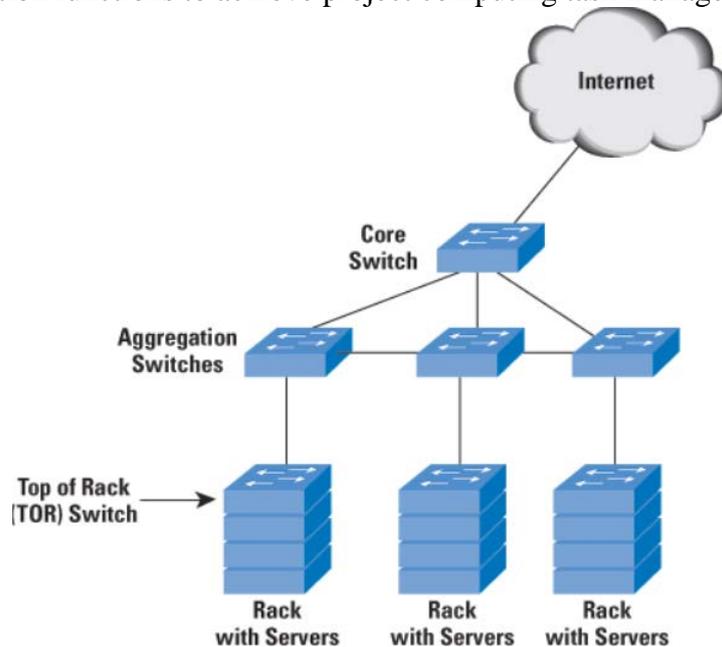


Fig.2 Cloud platform module architecture

5.1 A framework for the teaching aid platform for mathematical cloud computing based on Hadoop.

The Hadoop framework is an open source cloud-computing framework developed by the Apache Foundation based on the Java language [8]. Many well-known Internet companies at home and abroad use the Hadoop framework to develop their own cloud computing services. The core design of the Hadoop framework is Hadoop Distribution File System (HDFS), Distributed Computing Framework (MapReduce), Distributed Database (HBase), and Data Warehouse (HIVE).

Since Hadoop is developed in the Java language, the Web layer is developed based on the Java platform, so that the web layer can be well integrated with Hadoop. The web layer mainly accepts user requests and returns responses to users, including the teacher subsystem and the student subsystem, scientific computing subsystem and administrator subsystem. There are three ways for the web layer data interaction mode: interacting with the database web page information data, interacting with the HDFS resource file data, interacting with the math software through the web service, processing user requests, such as online mathematics, teaching resources uploading and downloading, and feeding back the processing results [8]. To the Web layer, online mathematics is the core cloud service provided by the auxiliary teaching platform. This service is aimed at teachers and students, and there will often be large-scale concurrent access. Therefore, Hadoop's Map Reduce parallel computing framework will be applied to this layer. The math service request is sent to different computers in the cluster for parallel processing, and the processing result is returned to the Web layer. This will not only complete small math projects, but also special projects such as big data processing and time-consuming scientific calculations [7]. The data layer uses a combination of MySQL and HBase to store a large amount of data, providing a consistent data interface. The resource storage access module of the mathematics assisted instruction platform is based on Hadoop's HDFS implementation.

5.2 The cluster architecture of the mathematics cloud computing aided instructional platform.

The reason why cloud-computing systems have superior computing power and storage capacity is the support of cluster computers behind them. The mathematics teaching aid platform under cloud

computing can organize the ordinary PCs of the mathematics room into clusters through the Hadoop framework. Provide high-performance and high-quality services to teachers and students, efficient use of room equipment, and large-scale parallel computing and distributed computing, such as big data processing [8]. Since the mathematic software is installed on each computer in the math lab, and the Hadoop system is deployed on each machine, each PC can become a computing server and be called by the scheduler of the Hadoop system.

6. Summary

In summary, the operational procedures and management systems of mathematics teaching reform in colleges and universities are imperfect, and the operational procedures of internal mathematics teaching reform lack scientific and standardized settings and regulations. Managers have a certain degree of randomness in the formulation of management systems. The subjectivity of education managers is strong, and it is difficult to conduct qualitative and quantitative analysis of the data and information of mathematics teaching reform. Therefore, in the era of big data, the innovation of the monitoring system of mathematics teaching reform in colleges and universities should proceed from the actual situation of the development of the university itself, establish the monitoring concept of mathematics teaching reform with big data cloud platform, and formulate the management system, operational process and organization. Targeted solutions to adapt to the development requirements of the era of big data, improve the mathematics teaching reform and efficiency of higher education institutions.

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