Research on Application of Teaching Informatization Construction Based on Cloud Computing

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Abstract

Cloud computing is the integration and storage of teaching resources in the cloud through modern network information technology, which can provide a convenient and fast platform for the construction and sharing of teaching resources informatization in colleges and universities. This paper first introduces teaching informatization and cloud computing, proposes that the main part of teaching informatization is teaching resources informatization, and the shortage of using information technology combined with it at present, and gives the advantages of cloud computing for teaching resources informatization application of high efficiency and sharing. Through the application of cloud computing, the teaching resources of colleges and universities are more perfect and sufficient, which is beneficial to assist the development of intelligent education and improve the education level, and promote the construction of teaching informatization.

Keywords: Teaching informatization; Teaching resource informatization; Cloud computing.

1. Introduction

1.1 Teaching informatization

Teaching informatization mainly refers to the whole process of using Internet technology to collect and obtain teaching information, adjust, improve and optimize teaching behavior.

It is an important part of education informatization. Guided by modern teaching concept and with modern information technology as the main instrument, teaching informatization serves teaching and learning, comprehensively improves teaching efficiency and quality and realizes modernization of college teaching. Its basic connotation includes five parts: infrastructure construction, teaching resources informatization, teaching process informatization, comprehensive service informatization and guarantee system construction. In recent years, the rapid development of mobile Internet, intelligent terminals, artificial intelligence and big data has had a significant impact on education and a great impact on the traditional manager-centered informatization construction. The teaching environment such as teaching means and

teaching space in the traditional sense has changed dramatically, and the time and space of teaching has been greatly expanded. Currently, teaching informatization construction is being explored and developed continuously, and it is expected that teaching informatization construction will promote the continuous development of education, innovate informatization teaching mode and cultivate high-quality talents to meet the needs of social development.

Cloud computing, virtual reality technology, mobile Internet, big data, etc. can boost the construction of college teaching informatization, and only when information technology is effectively applied, college teaching can cause a technological revolution. A lot of experiments have been made on the use of information technology: X. Liu and K. Li (2016) examine the impact of a teaching model that combines online learning and classroom flipping by building high-quality micro-course resources in a variety of ways on teaching and learning in higher education schools. Y. Li (2020) studies the application of information-based teaching methods in the English classroom. N. Li (2020) proposes the application of information technology in theoretical and practical teaching of college physical education elective courses. MH. S et al (2020), analyze the dilemma of computer education in information-based colleges and universities, and then proposes scientific countermeasures. M. Qin (2020) proposes to integrate information technology and give full play to the advantages of information technology in education, making the teaching of microcontrollers interesting and understandable. J. Zhu (2019), advocates the combination of multimedia network technology and the application of modern educational techniques and methods to reform and transform the teaching mode, teaching content and teaching methods of art education. F. Gao (2020) proposes a new way of thinking to build an information management teaching model. J. Chen and H. Dou (2021), analyzes the strategy of informatization of university education and teaching management in the era of cloud computing and big data, and designs a set of informatization management system. R. Wang (2020), proposes the model of cloud classroom teaching activities based on xAPI and PHP web development technology, which can record and analyze the whole process of cloud classroom teaching activities in detail. L. Yan and W. Yue (2020), grasp the three aspects of the connotation of information technology in education from three aspects: information infrastructure, education, research and human quality, and advocates the concept of information-based education.

The construction of teaching informatization still has the problem that information technology and education teaching have not achieved deep integration. At present, the application of information technology in all aspects of teaching is still only at the primary stage, the interoperability and sharing of data and resources between different information systems needs to be strengthened, and the integration ability of data and resources needs to be improved.

1.2 Cloud computing

"Cloud computing" has gradually become an important term in the information industry, and has gradually moved from a concept to a focus on implementation. Cloud computing is an evolution of information technology and a major business model for delivering IT resources. With cloud computing, individuals and organizations can gain on-demand network access to a shared pool of managed and scalable IT resources, such as servers, storage and applications (A. Sunyaev, 2020).

Cloud computing is a program that uses huge databases for data processing and file handling offering a

better approach to storage, application and computing performance in today's world (Tadapaneni, 2018). Generally, resources and data are integrated into small programs, which are then analyzed and processed by multiple servers so that these small programs can serve the users. In simple terms, cloud computing is a kind of distributed computing, which uses simple distributed computing to allocate and distribute tasks, and finally merges the obtained calculation results to ensure that mobile terminals can complete a large amount of data processing and data operations in a short period of time. This is the most common form of data computing and processing in information computing, and is the embodiment of the advanced science that network technology has evolved today. Compared with the traditional network model, cloud computing data is more thoroughly virtualized, making the stored data highly flexible, scalable, and cost-effective.

As far as the current application status is concerned, cloud computing is a collection of multiple services in a three-tier structure. First, the underlying structure of infrastructure services (IaaS), which mainly includes computing and storage, is equivalent to renting computers and data center storage space to customers, and can be reduced and increased at any time. Second is the mid-tier application platform service (PaaS), which mainly refers to the running environment of actual applications, equivalent to providing customers with a specific operating system VM, custom software stack and application set. The third is the top-level software program service (SaaS), which is mainly a runtime model for a large number of application programs and is equivalent to renting a software application program according to the actual needs of the user . Cloud service providers charge according to the hardware environment, system platform, type of software program and time used by the user.
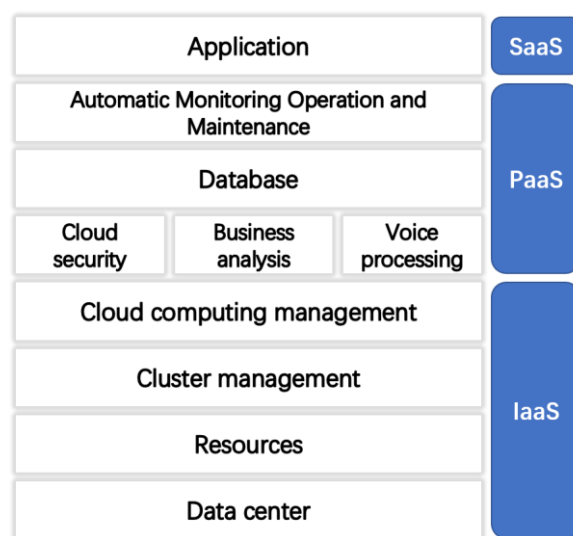

Figure 1. Simple construction of cloud computing.

The information construction of teaching resources is an important work for universities to promote information construction, which is a long-term and constantly updated process. And an advanced and stable network resource sharing platform is a guarantee for the construction and application of high-quality teaching resources. Cloud computing-based informatization teaching resource library can effectively improve the stability, scalability, sharing and security of the resource platform, which is not only conducive to the effective use of platform resources by users, but also improves the efficiency of platform resource management and maintenance. Therefore, cloud computing has a very important practical value in the

construction of teaching information technology.

2. Model Design

2.1 Infrastructure model

The rapid development of information technology and its wide application in education determines that the construction of modern teaching resources will be the eternal theme of teaching informatization in colleges and universities. The core problem facing the development of modern education technology today is how to use network multimedia technology to build teaching resources and how to effectively use these resources for teaching services. Therefore, this paper focuses on the application of cloud computing to the informatization of teaching resources. At present, the campus network construction of most domestic universities can meet the basic requirements and can build a cloud-based infrastructure model.
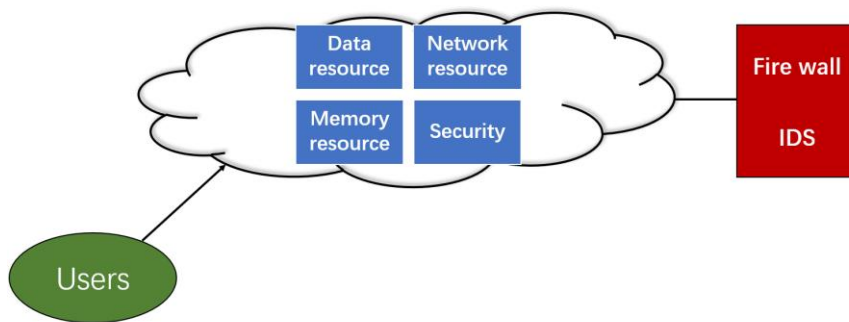

Figure 2. Infrastructure model of teaching informatization based cloud computing

The model is able to meet the needs of all parties in the university, such as students, teachers, researchers, administrators, and developers of information-based teaching and learning resources. The cloud-based infrastructure can provide computing and storage services to teachers and students, providing processing power, storage, networking and other basic computing resources that developers of teaching resources can use to deploy and run any software, including operating systems and applications, for network design and collaborative work to optimize all their needs.

2.2 Application model

The application model of cloud-based information technology teaching resources in universities is shown in Figure 2. The model is a powerful cloud network that connects a large number of concurrent network computing and services, which can use virtualization technology to extend the capability of each service and combine their respective resources through the cloud computing platform to provide super computing and storage capabilities.
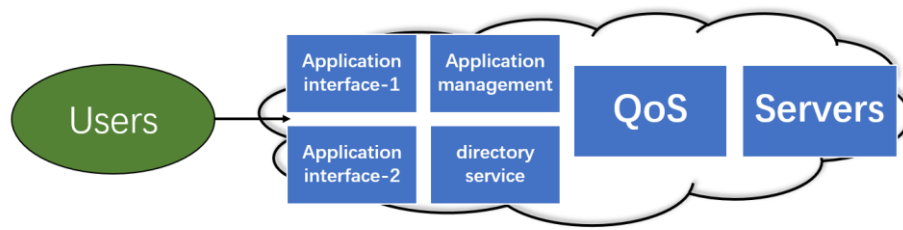
Figure 3. Application model of teaching informatization based cloud computing

Application interface. Provides an interactive interface for teachers and students to request services, and is also the entrance for users to use the cloud. Through a Web browser, you can register, log in and customize services, configure and manage users, and open application instances the same as a locally operated desktop system.

Directory services. Students and teachers can select or customize the list of services after obtaining the corresponding permission, or unsubscribe from existing services, and generate corresponding icons or lists to display the related services in the cloud subscriber side.

Application management. Used to manage cloud subscribers with computing resources and services available at the time of management, manage authorization, authentication and login for users, accept requests sent by users, and forward them to the appropriate applications based on their requests.

QoS. Autonomously deploys resources and applications intelligently based on user requests, dynamically provisioning and reclaiming resources.

Servers. Virtual or physical servers, managed by management systems, responsible for high concurrency user request processing, large computing volume processing and user web application services. The cloud data storage uses appropriate data cutting algorithms to upload and download high-capacity data in a parallel manner.

The most important features offered by cloud computing are availability and scalability. Application-based, user-friendly interfaces enable teachers and students to successfully scale their computing environments and quickly build personalized solutions based on content needs. Improved data mining techniques filter and find the content helping students. Students' goals are not limited to the curriculum or on-campus, so existing content is dynamically changing and requires customized services combined with third-party commercial services to build new applications.   Informational teaching resources are stored on a cloud with space sizes allocated on demand and flexible scaling, forming a teaching resource storage cloud.

According to the previous discussion and application practice of cloud computing in the field of education informatization, it can be proved that cloud computing has a broad development prospect in the field of education informatization in higher education with its unique functions, features and operation mode. Using cloud computing for the construction of informatization teaching resources in colleges and universities, it is only necessary to connect the management terminal to the running equipment to transmit and process the informatization teaching resources. The requirements of cloud computing for the terminal are not high, and different computer devices and terminal devices are able to access the teaching resources used smoothly, simply and quickly. Universities can allow different students to use their personal computers to connect directly to the cloud for teaching resources inquiry and learning when teaching activities are carried out,

reducing the school's capital expenditure on resources for purchasing equipment. There is no need to develop a separate information technology teaching resource system, which makes the operation of teaching activities easier and faster.

3. Conclusion

The establishment and processing of college teaching informatization under cloud computing is the demand of the development of the times, which can indeed be close to the informatization of college management, make the integration and closeness of college teaching resources informatization faster, facilitate teachers and students to break through the limitation of time and space, inquire the knowledge they want to learn under different spaces, bring great convenience to learning activities and teaching activities, and provide effective conditions. The infrastructure model and application model of teaching resource informatization proposed in this paper provide certain guidance for teaching informatization, which can improve the stability, scalability, sharing and security of the resource platform more effectively. It not only facilitates users to use the platform resources effectively, but also improves the efficiency of platform resource management and maintenance. However, there are certain drawbacks in the internalization of teaching resources in colleges and universities supported by cloud computing, which need to be studied by relevant educational researchers in order to promote the benign development of informatization teaching resources construction work.

Acknowledgments

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