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Information Security Management of Smart Campus System Based on Big Data

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Abstract:

Smart campus information security construction is an important part of information construction in higher vocational colleges. With the wide application of all kinds of information systems, the importance of information security is also getting more and more attention. At present, many problems in higher vocational colleges, such as imperfect information system construction and nonstandard programming of application system, may endanger the information security of intelligent campus in higher vocational colleges. In this paper, the current situation of information security construction in higher vocational colleges was analyzed and studied, and the management measures to strengthen the management and control of information security risks in smart campus were put forward in view of the shortcomings of information security construction in smart campus at present, so as to provide reference for information security management in smart campus in higher vocational colleges and escort smart campus.

Keywords: *Big data, Smart campus, Information security*

I. INTRODUCTION

As the network security of smart campus is related to the teaching quality and the dissemination quality of data and information in every higher vocational college, it plays a vital role in China's education and academic research. The information security problem of smart campus in higher vocational colleges is becoming more and more serious. For example, in many higher vocational colleges, the computer company applies the security protection mode mechanically, without the targeted research and deployment of information security according to the actual situation of the school, or analysis on the problem through the big data platform. In addition, the students in higher vocational colleges are basically teenagers between 15 and 20 years old, who have a weak awareness of information security and can't correctly filter and screen bad information in the network. The above will have a negative impact on the cultivation of their "world outlook, view of life and values".

Nowadays, computer network technology has become an indispensable support in people's life and work. With the help of network technology, the speed and quality of information transmission have achieved a qualitative leap, breaking the limitation of information transmission time and space[1]. The rapid development of the network and the popularity of intelligent application systems have brought many

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unstable factors to the campus network security belt, which makes it of great practical significance to strengthen the research on the computer big data information security processing technology. In this paper, the application of big data technology and the significance of information security, the hidden dangers of campus network, and how to establish campus security system were mainly studied, so as to provide reference for the security protection system of smart campus in colleges and universities, ensure the security and stability of higher vocational colleges' network, and escort the construction of smart campus.

II. BIG DATA TECHNOLOGY AND NETWORK INFORMATION SECURITY

Big data technology refers to the process of screening out valuable information for people to use according to different needs after recording and archiving all human production and living activities in a digital way and sorting out the huge amount of data in related ways and methods. Obviously, big data is not only very large in number and rich in variety, but also can be updated very quickly with the full penetration of network technology. Such large-capacity data information needs to be analyzed by scientific means, so that useful information which meets people's requirements for a variety of applications can be quickly extracted from the huge amount of data information to better serve people. Big data has been branded with the label of a new era, which is the key factor for the government to build an all-round comprehensive strength. It has gradually become a worldwide development trend and has attracted more and more attention from the international community[2]. Chinese government has made big data a topic and policy for many times, conducted special discussions, and used big data to optimize government functions and supervision and management, which shows that big data is indispensable to modernization reform.

In the era of big data, information data is not only large in quantity, rich in variety, but also fast in data analysis, processing and dissemination. Therefore, the level of computer big data information security processing technology should be comprehensively improved to ensure the quality and efficiency of data transmission. With the help of big data technology, computer big data can quickly and accurately complete the processing and analysis of information and screen out valuable information due to the variety of information, which can meet the diverse application needs of society and people for data information.

As the network information security management has entered the era of big data, big data not only poses unprecedented challenges to the internet security management, but also brings greater opportunities. Network information security is facing huge potential risks, which draws new energy for information security management[3]. The traditional network information security has encountered many problems, such as the imperfect information security management system, hacker intrusion, spam and information theft, virus and trojan horse inbreaking, system vulnerabilities and other issues, which will cause incalculable losses in the era of big data. Therefore, it is necessary to have a sense of overall situation, have accurate overall control, predict future trends and potential risks, and provide practical countermeasures for network information security management by using big data.

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III. AN ANALYSIS OF THE PRESENT SITUATION OF INFORMATION SECURITY CONSTRUCTION OF SMART CAMPUS SYSTEM IN COLLEGES AND UNIVERSITIES

3.1 Imperfect Top-level Design of Information Security Construction

As the construction of smart campuses in higher vocational colleges has only begun in recent years without relevant mature experience to learn from, and each school is basically "crossing the river by feeling the stones" according to the school's actual and development needs. In addition, due to the lack of information construction funds and other factors, each application system is purchased in a single way, which leads to the lack of uniform standards and protective measures for different business systems.

3.2 Incomplete Information Security System Construction

At present, many higher vocational colleges do not have a mature and perfect information security management system, network information security awareness, information security risk assessment and response measures for information security risks. In addition, in higher vocational colleges, although relevant management departments have been set up for the safe operation of smart campus, the information security management departments seem to be busy with their work and regularly maintain the network information on a daily basis, but the potential safety hazards still exist.

3.3 Hardware and Software Risks

As many smart campuses in higher vocational colleges have been built for many years, and hardware facilities such as routers, servers and switches are not maintained and updated in time, all kinds of failures are easy to occur, so that the stable operation of smart campuses cannot be guaranteed. Correspondingly, there are also software risks. The speed of software update required by many smart campuses in higher vocational colleges can't keep up with the speed of computer technology development, and system vulnerabilities can't be repaired in time, resulting in potential safety hazards.

3.4 Poor Awareness of Information Security of Teachers and Students.

In higher vocational colleges, except for computer teachers, most teachers and students don't know much about computer viruses, network attacks, malicious codes, etc. They may have such operations as downloading software at will on the Internet, clicking to open emails in e-mail boxes without careful identification, single password, etc. Besides, they neither regularly kill viruses on computer hard disks, nor have the habit of keeping backup data, and their awareness of information security is relatively weak.

3.5 Lack of Talents for Information Security Management

As information security is a relatively emerging major, many computer teachers in higher vocational colleges often have no professional knowledge of information security, and have limited management level

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in the smart campus. Coupled with the lack of professional information security management talents and teachers' heavy teaching tasks, they are often at a loss when dealing with information security problems, unable to quickly solve the problems in a short period of time, which brings inconvenience to teachers and students in using smart campus.

IV. CONSTRUCTION OF INFORMATION SECURITY MANAGEMENT SYSTEM OF SMART CAMPUS SYSTEM IN COLLEGES AND UNIVERSITIES

The smart campus is a complicated complex, involving all aspects, generally requires the use of a multi-layer distributed hybrid architecture and overall security protection strategies. The construction of smart campus information security management system mainly involves hardware, technology, management, talents, etc.

4.1 Establishing an Information Security Management System

It is the basic guarantee for the safe operation of smart campus in higher vocational colleges to establish an effective information security management system according to the specific situation of the school. First, it is necessary to set up a functional organization of information security management grading system, which is responsible for management, supervision and assessment. Second, it is necessary to formulate an information security management system to clarify the rights and obligations of teachers and students to use the smart campus, so that there are rules and laws to follow, and offenders will be prosecuted.

4.2 Updating the Hardware and Software Facilities in Time

The normal operation of hardware facilities is the primary condition to guarantee the smart campus, especially the hardware facilities such as core switches, routers and servers of relevant application systems, which must be updated in a timely manner. Hardware failures if found should be repaired in time to avoid affecting the normal use of smart campus. Computer equipment used in various departments also need to be updated with operating system patches and application system software upgrades on time to prevent vulnerabilities and virus intrusions. It is also necessary to strengthen the management of key equipment rooms through the access control system, regularly check the logs of key equipment, scan the system to find loopholes, upgrade system patches, and regularly back up data, etc., so as to discover and eliminate potential information security risks in time [4].

4.3 Making Full Use of Computer Information Security Technology

In order to ensure the daily operation of the smart campus, the identity authentication technology should be firstly adopted to ensure the normal operation of users, because it can limit illegal users to enter the campus network and ensure that the data in the smart campus are not obtained and randomly modified by some illegal users. Secondly, the firewall technology should be adopted, because it can effectively

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prevent the information theft from the intelligent campus caused by external illegal activities, which is beneficial to effectively protect the information security of the intelligent campus in higher vocational colleges. Finally, the application of intrusion detection technology can effectively prevent illegal operations and malicious information invading the smart campus of higher vocational colleges, and improve the information security protection of smart campus.

4.4 Designing Application System Access Application

Because the smart campus already has many application systems, various application systems added later have the need to connect with the existing application systems. Therefore, the relevant responsible person of the department and the construction party will be required to fill in the application system interface application form and confidentiality agreement in order to prevent the leakage of information and data when each department needs to build a new application system and interface with the previous application system.

4.5 Improving the Information Security Awareness of Teachers and Students in an All-round Way and Carrying Out Information Security Training for the Faculty

First of all, each department of the school should be assigned and trained information security officers to control the relevant websites, personal office computers and other data and equipment related to information security of each department in real time. Secondly, a seminar on information security will be held every year for freshmen, so that they can understand the importance of information security at the beginning. Thirdly, information security-related elective courses are offered for students, so that they can deeply understand the importance of information security[5]. Finally, a daily information security publicity and education system is established to enhance the awareness of information security prevention among teachers and students in the whole school, and reduce the probability of information security accidents.

4.6 Introduction of Information Security Management Professionals

As the management guarantee and technological innovation of information security mainly rely on professionals, information security management personnel are an important force to maintain information security by recruiting and introducing information security professionals. The introduced information security management talents also need to go through the corresponding induction training to improve their business level and management ability, and also need to actively go out to participate in information security training and conferences, and visit and exchange learning in other higher vocational colleges, to learn from the experience of information security construction in similar colleges. Finally, information security equipment companies should be invited regularly to train and communicate with school information security management personnel on new technologies.

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V. APPLICATION ANALYSIS OF INFORMATION SECURITY MANAGEMENT SYSTEM OF SMART CAMPUS SYSTEM IN COLLEGES AND UNIVERSITIES

5.1 Application Effect

Through the construction of big data service platform, the integrity and standardization of data have taken a big step forward, and data capitalization and servitization have been effectively improved.

5.1.1. Realize the integration and accumulation of data assets.

The big data service platform is applied to widely collect internet data and location data of schools, apply system data to various businesses in the campus network, clean, analyze and model the collected data, visualize the data, and integrate and accumulate data assets of schools.

5.1.2. Provide basis for decision-making and reduce management costs.

The big data service platform collects the life data of teachers and students and the education data of daily teaching in a unified way, and uses data analysis and modeling tools to deeply mine and analyze various data based on relevant algorithms to assist business management. According to the results of big data analysis, it provides an objective decision-making basis for the management department, thus reducing the investment of manpower and material resources, so that the school can flexibly generate all kinds of real-time data through the tools provided by the unified data service platform, combined with business characteristics.

5.1.3. Provide data support for diagnosis and improvement work and one-stop service.

Data standards are unified throughout the school, and internal quality assurance system information diagnosis and improvement platform data and one-stop online comprehensive service hall data can be flexibly invoked as required. All-round display of schools, majors, courses, classrooms, teachers, students, etc. will be conducted to build a target chain and a standard chain connecting up and down, which will fully reflect the school's running status, improve the working procedures of decision-making, command, quality generation, resource guarantee, service support, supervision and control, and dynamically monitor, warn and improve the completion of various school tasks in real time according to the curve eight quality improvement spiral, so as to improve the school's management efficiency and quality.

5.1.4. Improve the campus security system and realize the timely prevention of security incidents.

Through extensive collection, mining and modeling analysis of structured and unstructured data, the big data service platform can timely identify students' leaving school, returning to school late, sedentariness and other school safety issues as well as network dangerous remarks, and send warning notices to the teachers in charge so as to timely intervene in management and promote the change of

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student management from result-oriented management to prevention-based management.

5.2 Innovation Points

5.2.1 Technological innovation

Based on different scenarios, the big data platform not only provides schools with data services, flexible presentations and applications, but also provides standard API interfaces, which can build a dedicated data service application on the platform and put the service application in the data service hall[6]. The data analysis results are displayed in a panoramic way, and the business results are instantly pushed through small programs combined with WeChat official account. Innovation points include: Firstly, data standardization, servitization and capitalization. The big data service platform is defined as the basic platform of the school's overall informatization to collect real-time structured data, semi-structured data and unstructured data related to teachers and students, and to realize data standardization, assets and services. Second, the developer platform. The standardized API interface is provided externally, on which the school can flexibly invoke and develop data application services. As a developer, the school realizes business accumulation on the platform provided by the enterprise and promotes through school-enterprise cooperation. Third, C-end orientation. Through the combination of applets and WeChat official account, it directly targets at each individual in the school, realizes end-to-end data service and personalization through different permission settings, and provides effective business support. Fourth, the continuous support of informatization. Through the developer platform, the school as a developer shares the business value of the data application services jointly developed by the enterprise, and the enterprise continuously makes informatization investment by way of property fund donation. Fifth, use of the service module according to the demand. It does not need to spend too much money to build a big data platform, reduces the cost, difficulty and risk of building a big data platform based on demand, and pays according to service modularity.

5.2.2 Concept innovation

The school has achieved four changes in information construction with the concept innovation. First of all, financial investment and school financing are changed into external financing. Secondly, buying servers is changed into buying services. The introduction of advanced enterprise concepts and technologies, the use of enterprise professional team strength, the adoption of a market-oriented, contractual approach, purchase of services from social organizations, enterprises, institutions with professional qualifications, all these not only save money, reduce the cost of operation and maintenance, but also improve the safety factor, reduce the risk of information. Third, the simple purchase of software is changed into school-enterprise cooperation in research and development of related software. According to the actual application of the school, a cooperative enterprise is introduced to tailor-made and jointly develop related software, so that the research and development results can meet the needs of the school to the greatest extent. At the same time, through the joint ownership of R&D achievements by Party A and Party B, a win-win situation between schools and enterprises can be realized. Fourthly, information

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construction is changed into platform construction. To achieve decision based on data, a digital teaching and research platform, a management service platform, a safety guarantee platform and scientific decision-making platform have been built relying on the construction of national digital campus experimental school, a fully functional one-stop online service hall has been built, and a digital platform for the diagnosis and improvement of the school's internal quality guarantee system has been improved.

VI. CONCLUSIONS

In the process of building a smart campus, information security should always be put in the first place, and a series of measures should be taken to eliminate information security risks, reduce information security risks, ensure network information security on campus, make the value of smart campus play out, and provide a safe campus network environment for all teachers and students. In this paper, the current status and existing problems of network security in higher vocational colleges were analyzed, the information security management system of smart campus system was constructed under the background of "internet plus" and its application was analyzed in detail, which can effectively solve the problems of network and information security in higher vocational colleges, and promote the construction of smart campus in higher vocational colleges to enable management, service, life and other aspects.

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