Study of Wisdom Decision-making System Viewed from School Development Planning Perspective in Big Data

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Abstract

The construction of informationization has developed into a new stage, which takes intelligent service as the core. How to mine valuable information from big data, and provide the most convenient services for teachers and students in aspects of teaching, research, management and life, various colleges and universities must to face the problem. This paper analyzed the status quo of intelligent management decision system, discussed the challenges of big data to wisdom management decision, and expounded the research objects and content of wisdom management decision system. Then introduced the wisdom management decision system from four aspects: school level decision-making information, second-level units' management and decision-making information, teacher's teaching and scientific research decision - making information and student training and learning life decision-making information.

Keywords

Higher education information; big data; decision support;

1. Introduction

With the development of informatization process in colleges and universities, the digital campus construction, focusing on management informatization and service intelligence, has encountered the development opportunity. With the wide application of new information technologies, such as cloud computing, Internet of things, mobile Internet, big data and knowledge management and social networking, university informatization has entered into a new stage——wisdom campus[1]. Using the services and the discovery, analysis, problem-solving abilities, provided by wisdom campus, to carry out innovative education management is the inevitable trend of the future development of information technology in colleges and universities. And in the running process of digital campus, it collected huge amount and various data of user informations. How to dig out valuable information from these big data, how to provide the most convenient services for teachers and students in aspects of teaching, research, management and life, and how to truly transform the information technology into intelligent services, these are the higher requirements for the construction of information campus[2]. So, it is imperative to establish a complete, scientific, systematic wisdom management decision-making system. The system can analyze and identify problems, create or modify the decision model, provide, evaluate and optimize a variety of options; it can combine personal intelligence resources and computer system analysis capabilities, thus, it can improve the accuracy of decision-making; Also, it can provide the data, messages and background information for decision makers, and help decision makers clear decision goals.

2. The Status Quo of Intelligent Management Decision System

With the application of cloud computing, internet of things, mobile internet technology in university information construction, various information systems generated and stored a large number of educational and teaching data. By means of integrating the available data and real-time presentation, mining and analyzing the historical data, we can realize the information state analysis and the change tendency forecast. It can enhance and promote the management ability of colleges and universities, upgrade the educational competitiveness of universities and provide the basis for scientific decision-making in universities. However, there are the following problems in practice[3,4]:

2.1 Information Systems are Short of Analysis and Decision Support Functions

At present, most of the information systems are online transaction processing system. Thees systems can't provide the function of synthetic data collection, analysis and comprehensive utilization. They have not the capability of decision support, unable to collect data directly from various information systems and use them synthetically. Large amounts of data generated by the information systems cannot be upgraded to knowledge, and provide it to the decision-making department in time. To develop a decision-making often need to query multiple information systems based on multiple heterogeneous data sources and associated external system, furthermore, decision can be make on the basis of extensive data analysis.

2.2 Data Quality and Effective Utilization Need to be Strengthened

In the process of informationization, university accumulated massive education and teaching data, but there are not much valuable information. Whether data can bring value and transform into decision-making benefits or not, not only depends on the amount of data, but more importantly, depends on the availability of data and its rational use. Correctly and reasonable data can give a scientific answer, so the degree of dependence on the data is getting higher and higher. This dependency includes the "amount" of data, also includes the "quality" of data, i.e., accessibility, intelligibility, reliability, and availability of data.

3. Challenges of Big Data to Wisdom Management Decision

With the arrival of big data age, during the process of informationization, the information systems, like research, management, life and others, generated and stored a large number of educational and teaching resources. These resources record the development of school and its historical evolution. Research and analysis of these massive resources, can dig out the potential and valuable information, can provide scientific basis for intelligent management decision-making, to improve management wisdom and efficiency. However, huge data resources are complex, which contains a large number of structured, semi-structured, unstructured, process-oriented, modular data (such as documents, pictures, videos, reports, logs, etc.). By deep processing, sorting and analyzing the data, we can transform the data to the valid information and forming knowledge. That provides a strong support for the school to achieve intelligent management and improve the teaching level.

Since 2011, our school began to campus information construction based on the cloud architecture. After two phases of construction, we have built a cloud data center. The center mainly stored the teachers' and students' personal information, all information systems business data, public information, etc. As time goes on, data stored in cloud data center increased significantly, but cannot play the service consumption characteristics. The teaching, research, personnel, finance, assets, management and other works produce data at all times. How to achieve the horizontal mining of these data, to achieve teachers' teaching, research, management, and students learning, life and other information horizontal connective with management data at all levels. The mining and analysis of various types of data, such as raw data, new data, unique data and special data, provide scientific data support for the wisdom management decision-making at all levels in colleges and universities. How to make big data

play a greater role in three functional aspects of the colleges and universities: further enhance personnel training, scientific research and social service functions, is a new challenge for the wisdom of university management decision-making proposed by big data.

4. Research on the Intelligent Management Decision System in the Big Data Age

4.1 Research Objectives of Wisdom Management Decision-making System

The core value of big data technology is storage and analysis on massive amounts of data. The core feature of wisdom campus is to obtain a large number of activities and status data, through a variety of intelligent terminals, perceived equipment and information systems. As well as mastering the law of things based on these massive data analysis, carrying out the wisdom applications. The combination of big data and wisdom campus is the key to the construction of wisdom management decision system in the era of big data.

The storage, calculation and analysis for large amounts of data on the basis of cloud computing and big data technology, based on the organization and modeling of large data, we can dig out the value of big data, master the law of data, to achieve the data mining chart analysis services for decision-making and provide decision-making information for various activities in colleges and universities. Management and decision-making services for secondary units and institutions, personal life information services for teachers and students in work, study, life and others, those are the technical foundation of intelligent management decision-making application.

4.2 Research Content of Wisdom Management Decision-making System

University administrators need to grasp the full range of schools' various educational data, fully master the quality of teaching and state of schools, from the aspects of the time dimension, the regional dimension, discipline construction, teaching resources, scientific achievements, the students' level etc. The intelligent management decision-making system is based on the virtualization platform and the cloud data center, take big data technology as the core, all-round collect the information from various information systems and associated data sources , such as teaching, research, personnel, assets, teachers and students etc. Extract the valuable information from large data during the process of data collation, aggregation, analysis and mining, and take the most convenient services for teachers and students in teaching, research, management, life and other aspect, provide a global view of school resources for university administrators, to provide scientific basis for managers' wisdom decision, and realize the object of achieving the information technology into intelligent services.

The main contents of the research on wisdom management decision-making system include:

(1) School level decision-making information

School decision-makers need to master the whole macro data, data collection layer need to collect the main data produced by the service object, such as colleges, business units, teachers, students and other clients. But also need to link the original data and external data generated by the information systems. Data analysis layer can carry out extraction, summary, induction, model system analysis and chart system transformation using SQL rapid query, Hadoop deep analysis query, data mining tools, OLAP tools. Finally form graphical decision information, and then show in front of the decision makers in an intuitive way.

Fixed stamen: Such as regularly reflect the number of school enrollment, the number of graduates, student-faculty ratio, research results and other data, as well as the superior competent departments, like the national and local Ministry of Education, Education Department, need to collect the school's relevant data reports.

Statistical analysis: Such as through regression analysis to identify the key factors that affect student satisfaction in students, curriculum, teachers, teaching and learning outcomes, etc.

Multidimensional analysis: Analyze and queries from multiple perspectives, such as from the subject of professional, time, campus, training type and other dimensions to find the problems in personnel training ; Analysis of the short board affect the reputation of school from the admission situation, graduation employment situation, student-faculty ratio, research results, international exchanges and other angles; Analysis of whole school information internal structure for faculties, professional, grade and others, through the discipline, professional, campus, student grade and other internal structural characteristics.

Pre-alarm function: For example, when the quality of talent cultivation or scientific research results dropping, it can automatically sent remind to the message to focus on.

Predictive analytics: According to running information saved over the years, analyze the growth indicators of school, and predict future trends, thus providing support for the rational allocation of resources.

Optimization analysis: Such as according to schools' present condition, students, teachers, resources, research and personnel training, analyze the allocation resources and input and output situation.

(2) Management and information decision of second-level units of university (departments, institutions, places, etc.)

The leaders of second-level units need to master the relevant data of this unit, in order to better allocate and use the limited resources to maximize the value. The relevant data which need to master includes: The original data and the newly generated data of this unit, information about the relevant units, external data and other information. Specifically include: educational information of this unit, such as teaching workload, including teaching workload, teaching reform, academic achievement, professional setting, key curriculum construction, etc. information about scientific research, including research funding, scientific achievements, high-level papers, key laboratory construction, etc. Student job information, including counselor information, student's status information, student party building work, student employment, student scholarships and other information; Teacher information, including teachers basic personnel information, teachers traveling abroad, the high-level personnel information, the social benefits, the various assessment information, etc. Party work information, including the various policies and regulations information, implementation of the plan, documents transferring situation, the work of party building, etc. The asset information, logistics expenses and so on. These data are excavated, collected, summarized and screened, looking out the data related to decision management, after the process of data model analysis, model operation, digital chart conversion, display model show, present in front of decision-makers in the most intuitive way.

(3) Information decision - making of teacher's teaching and scientific research

The data information during the process of teachers development, including teaching, research, work, study, life, campus activities. Mainly include: personal basic information; Teaching-related data, including teaching materials, online teaching resources, students' teaching evaluation, teachers' teaching situation, academic papers, key course construction situation, teaching workload and other information; Scientific research data, mainly including scientific research projects, scientific research teams to participate in, research papers, patent monograph information, experimental data, research funding and other information; as well as other relevant data and these information's collection, classification, collation, model mining, data model analysis, digital chart conversion, display model display, etc. And with the support of scientific research big data, we strive to play a role in teachers' wisdom scientific research. By mining and analysis of the scientific research data, it can provide personalized recommendations for teachers' research projects declaration, recommend partners for the researchers actively, to achieve the purpose of applying scientific decision-making for teachers' teaching and research.

(4) Decision-making of student training and learning life

The data and information required during student education process, including participate in scientific research team, research activities, learning, grades, employment, life, campus activities and other

information. Mainly include: the basic information of students, grade of various subjects, credit access, scholarship information, community activities, scientific research, social practice, postgraduate examination information and other related data, as well as these information's collection, classification, collation, model mining, data model analysis. By mining and analysis of information, we can find students' behavioral characteristics of successful and potential demand; push personalized recommendations for elective courses and other information services, to achieve individualized teaching and personalized personnel training model.

5. Conclusion

With the development of informationization process in colleges and universities, the focus of digital campus construction transformed from information management, which take management as the core, to the information service stage, which take service as the core. How to make the valuable information extracted from big data to provide services for teachers and students in teaching, research, management and life with the most convenient way, how to transform the information data into intelligent services, this is the new and higher requirements for the information campus construction. The wisdom of management decision-making system used in informatization construction in colleges and universities, it can dig out the potential information from the massive data, let data resources play its service value, build a sound higher teaching quality securing data system, facilitate using data to speak, using data to manage, using data to make decisions, so that, it take better service for the campus, enhance the management capacity and promote scientific decision-making level, enhance the core competitiveness of schools.

Acknowledgements

The authors gratefully acknowledge the subsidy provied by the Educational technology equipment and practice of educational research project in Henan Educational Committee (project number:GZS036, GZS290); Teaching and Research Reform Project of Henan Polytechnic University(2015JG100).

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