

Analysis and Exploration on Construction of Intelligence Teaching Environmental System

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Abstract: The construction of intelligence teaching environmental system in colleges and universities has been at an early stage for quite a long time. To successfully complete the intelligence teaching environmental system, the effort of innovation and development are also needed in terms of educational theory, technology application and system construction. The author carries out an in-depth study of the definition of the intelligence teaching environmental system, and conducts field research in colleges and universities. The study found that there is a shortage of intelligent interaction in current intelligence teaching environmental system. Therefore, based on this study, the author put forward suggestion of constructing intelligence teaching environmental system.

1. INTRODUCTION

In recent years, with the rapid development of education informatization, both colleges and universities are actively exploring the establishment of the "intelligence teaching environment". However, some of the construction models only improved the teaching facilities without setting up a truly "intelligence teaching environment". How is "intelligence teaching environmental system" formed? What is its connotation? This article analyzes the concept and status separately of intelligence teaching environmental system, and provides valuable suggestions for the future.

2. DEFINITION OF INTELLIGENCE TEACHING ENVIRONMENTAL SYSTEM CONCEPT

At present, there are only few international researches on intelligence teaching environment, including the research "Active Learning Classroom" in University of Minnesota and "iRoom" in Stanford University. After searching international authoritative periodicals, it has been found that theories as "the development of learning modes that

new technologies enter the classroom", "providing adaptive learning content" and "the impact of learning environment on learning performance" are mainly focused by researchers.

The 2015 China White Paper on Intelligence Learning Environment pointed out intelligence learning acts as one type of learning system, which automatically records learning processes and evaluates learning outcomes through modern high technologies such as Internet of Things, big data and artificial intelligence(Ronghuai Huang, 2015).Intelligence teaching environmental system should utilize cutting-edge technologies to manage, aggregate, analyze, and drive multi-dimensional data such as teaching, infrastructure facility, campus activities, students' behavior trajectories, and related intelligence teaching environment; construct holographic network environment, cloud computing Data center, big data analysis application system and multi-dimensional IoT perception system which aims to realize the precise distribution and allocation of related resources in the intelligence teaching environmental; integrate high-quality resources and advanced technologies to build an advanced, efficient and practical intelligence teaching environment; realize the organic integration of education and communication, teaching and research, learning activities, educational administration and campus infrastructures; realize the intelligent decision-making, intelligent implementation and

intelligent evaluation of teaching and learning process so as to realize online interactive teaching without limitation of time and space; make sure that high-quality resources can be easily shared. Through construction of intelligence teaching environmental system, it has good effect on university construction, reform and development, promotion the in-depth integration of information education technology, and optimization of teaching environment.

3. CURRENT CONSTRUCTION STATUS OF INTELLIGENCE TEACHING ENVIRONMENTAL SYSTEM

At present, many institutions are trying to build up intelligence teaching environmental system. The author conducted field researches in some typical universities and summarized the types of intelligence teaching environmental system:

3.1 Upgrade of General Laboratory

This type refers to the renovation for completed laboratory, with the benefits such as enhancing some equipment parameters, advancing the multi-media device configuration, making seat configuration more flexible and comfortable. With high-resolution teaching tool, hive layout and other measurements, "intelligence classroom" is to be built.

3.2 Interactive Teaching Platform Application

"Intelligence classroom" usually refers to multiple interactive teaching platform. The common scenarios are including: fixed space with LAN interaction. non-fixed site with interactive Internet. mobile interactive teaching.

Fixed space with LAN interaction. This interactive system is generally installed in the computer room, where each student is equipped with a desktop computer. Through the LAN interactive teaching system, it can basically have achieved to exchange data, download and upload information between teachers and students.

Non-fixed site with interactive Internet. This kind of "remote classroom" is usually equipped with high-definition video camera, live broadcast, recording and broadcasting management system, which can cover more subjects to be taught across multiple regions.

Mobile interactive teaching. Through unified identity authentication, such systems can make it more convenient and frequent to produce and record the data of the teaching process, and initially form a statistical report on the teaching situation.

3.3 Teaching Resources Library

Some colleges and universities are strengthening the utilization of cloud resources with the assistance of network teaching resources. For example, the construction of "sky classrooms" and "online courses" and other learning platforms provide more options to be taught. Such learning platforms often require students to take the initiative to learn to reflect actual teaching value.

3.4 Internet of Things Applications

Some universities have increased IOT control terminals, such as the electric curtain with light control, air conditioning with external temperature sensor in the laboratory, so that the entire teaching environment can automatically adjust within the pre-set threshold according to the external environment. This type of teaching environment basically achieves the full coverage of the network and combines some cutting-edge technologies to display an outline of intelligence teaching environment.

4. SHORTAGE OF TECHNICAL INTEGRATION ON INTELLIGENCE TEACHING ENVIRONMENTAL SYSTEM

Through summary of status, it can be seen that at this stage there has not been successful case of "intelligence teaching environmental system" which centers on teaching subjects. Currently, cutting-edge technologies don't complete interoperability, big data cannot generate higher value and there is no closed loop of teaching ecology. Here the author will analyze in terms of environmental perception, data standards and personality development:

4.1 Lack of Full Awareness of the Teaching Process

Most of the IoT technologies used in intelligence teaching environment are only very simple applications of the perception of external teaching environment, without perception of teaching

process(YongheZhang,2012). To record intellectually the teaching process in the classroom, technologies such as IoT and artificial intelligence have to be used to capture every aspect of the process, identify, detect and analyze the video captured by the embedded intelligent analysis module. Based on the algorithms of artificial intelligence and pattern recognition principles, data that can truly reflect the teaching process will be produced

4.2 Lack of Unified Data Standards

At present, colleges and universities have initially realized the application in different teaching platforms, such as teaching interactive platforms, online courses, sky classrooms, etc. These teaching platforms or systems can obtain high-frequency knowledge data from students in different teaching environments. However, due to lack of unified data standard, the purpose to drive learning method through data cannot be achieved. These high-frequency knowledge data cannot receive effective data management, and cannot provide effective data support for big data analysis.

4.3 Lack of Personalized Teaching Resources to Match

The most fundamental feature of intelligence education is purpose to change the traditional teaching mode with information technology (Kekang He,2015). In the traditional teaching mode, the relationship between teacher and student's knowledge transmission generally belongs to the unified knowledge pushing mode. Teachers cannot get the feedback of pushing knowledge in time. Students also receive all or part of knowledge from one person to another. In the end, the reception can only be reflected through variety of centralized exams. This traditional teaching model cannot maximize the potential of students. To construct intelligence teaching environmental system, it is necessary to change three points: (1) to change the methods and modes of knowledge dissemination and management so that the knowledge become touchable and pushed to the students in time; (2) Positioning individual role of teachers and students to achieve accurate push of knowledge; (3) through highly interconnected teaching facilities and analyzing teaching needs based on habits, it can be achieved to intellectually distribution of teaching facilities and form eco-friendly and energy-saving intelligence teaching environmental system.

5. CONSTRUCTION DIRECTION OF INTELLIGENCE TEACHING ENVIRONMENTAL SYSTEM

The author believes that the construction direction of intelligence teaching environmental system should innovate and integrate in terms of system construction, technology application and theoretical model. Several suggestions are listed below:

5.1 Strengthen the Top Design, Improve the System Construction

The construction of intelligence teaching environmental system includes series of construction directions such as the campus environment, teaching facilities, discipline construction and system construction. In the process of forming intelligence teaching environmental system, it is needed to emphasize the top-level design, improve the system construction, attach importance from school level and cooperate from all departments. For example, after reaching an agreement on the association between the public cloud and the private cloud, the identity authentication of teachers and students can be associated with the Internet data to realize the hybrid application of the public cloud and the private cloud.

5.2 Multi-technology Integration to Achieve Ecological Information Closure

Through new generation of information technology, it is to achieve the reconstruction of the entire education information system. So that teaching resources and personalized push of data and information will be precisely distributed, along with intellectual adjustment of teaching process, teaching methods, teaching environment and teaching resources. It is expected to form a closed loop of information ecology in intelligence teaching environment system driven by data intelligence.

5.2.1 Collection Integration and Management of Multi-model Big Data

IoT data that can be collected and researched through IoT data collection includes classroom facilities (classroom doors, curtains, air conditioners, speakers, lights, etc.), video surveillance data (classroom video surveillance and auto tracking,

etc.), Human Data (Infrared), and various other IoT data content.

5.2.2 Teaching Data Collection

The new teaching data collection model must take IoT and mobile Internet as environmental parameters to collect students' learning data, curriculum data and classroom teaching interactive data based on the teaching data at the level of schools and teaching units, the teaching data at the curriculum level, the teaching operation data of the network course etc. Rich teaching resources are determined by variables and models based on specific circumstances and needs, so that it can be able to understand students' learning situations in different aspects and in multiple dimensions.

5.2.3 Campus Business Data Collection

With the high technology of distributed high-speed high-reliable data acquisition, high-speed data whole image, it can be achieved to conduct secondary development for the collection tool; at the same time, for business data which cannot get from the system interface, it can be analyzed manually and check the data accuracy through database access.

5.2.4 Students' Track Data Acquisition

Based on the students' basic information, location information and behavioral action data, combined with IoT concept and technology, through direct acquisition and correlation analysis of two ways 'acquisition to analyze the student's behavior trajectory in school to provide data foundation in terms of analyzing students' personal behavior, group behavior characteristics and behavior early warning to improve the management of student behavior and control.

5.2.5 Relevant Intelligence Teaching Environment of Internet Data Collection

Through the crawler engine technology such as crawling the recruitment website and talent demand network data, it can be researched for the relationship between positions and capabilities and achieved to establish individual demand capability model, so that different talent demand competency and industry recruitment analysis can be pushed to students; Secondly, through keyword searching, targeted monitoring and analysis of hot forums and

site data, data reference and early warning can be provided for the school to control public opinion risk.

5.2.6 Governance Research of Multi-model Big Data

The establishment of full data warehouse: Through tapping full data and incremental data from the application system, it can establish a full original data warehouse by Hadoop. Through standardization of original data and storage in standardized database, then an application theme database is established through modeling and analysis. Subsequently, the theme database is synchronized to application access library to provide data access for front-end applications. The retrieval center supports the management and retrieval of the overall data warehouse.

5.2.7 Full Data Backup Management

Data warehouse contains the original full data and incremental data, standardized data, as well as the model theme data, that is, to achieve a full backup of the database; if backtracking of business data is needed, the platform realize the data backup through the independent storage of incremental data, and manage the different versions of the backup edition in visual way by collecting the full amount of the original data into the full database, customizing the backup strategy of incremental data and lock the data of each backup in the meantime.

5.2.8 Research on the Application Interface with Big Data Open Standard in Intelligence Teaching Environment

Based on the big data open standard in intelligence teaching, referring to tri-factor system of management, supervision and working, guaranteeing the premise of interface access performance and data processing performance, adopting custom shading technology and column storage technology, studies on application interface development under the data storage diversity of big data platform can explore the best application service interface architecture under the big data architecture and establish a high performance distributed service interface that can access all the data storage uniformly to meet the needs of the school application development and data query.

5.3 Build up an Open, Interactive Intelligence Teaching Environmental System.

Based on the five levels of campus management, teaching, service, employment and research, studies on the application of various types of data in the campus, can analyze the data variation on both time and space dimensions. Considering the development trend of data in the future, it can achieve to establish the management and service model of intelligent prediction and machine learning. Based on the campus big data management and teaching service model, it can also have deeper investigation of associated analysis through data acquisition, data storage, data cleaning, analysis modeling, business presentation and others; Through analysis and judgment of the teachers' behavior, it is helpful to recognize the students, understand the students, discover the individual characters adequately and achieve individualized management. It can achieve to provide each student with services such as personal information services, early warning, study and employment; provide good controllable teaching support and resource application services for teachers' teaching as well as convenient interactive teacher-student communication services; Provide data report for management and decision support.

6. CONCLUSIONS

The essence of intelligence teaching is to provide better services and more convenient teaching support for teachers and students by making full use of advanced technical measures to improve education management and decision-making process. The formulation of teaching policy is no longer a simple empirical imitation, nor limited understanding, hypotheses and inferences by policy-makers without full-scale surveys, arguments and scientific judgments. Instead, it is emphasized that more refined capture of changes at all levels Data, and the complex correlation and causal relationships demonstrated by the data, could turn the crisis of instructional and policy decisions into opportunities. In the aspect of teaching decision-making, the intelligence teaching environmental system will help policy-makers to understand the status more clearly and acquire more comprehensive and valuable information in a timely manner. The formulation, implementation and adjustment of data-driven teaching policy will be made. In the construction of

intelligence teaching environmental system, we should promote steadily and improve the construction gradually as a long-term, ecological and advanced systematic project.

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