



The design of “Internet +” teaching platform in colleges and universities based on teaching big data

Ping Zhou ^{a*}, Yong Gu ^b, Peishun Wang ^c

Information Management Department, Zhongnan University of Economics and Law Wuhan, China

^{a*} zhouping@zuel.edu.cn, ^b gy@zuel.edu.cn, ^c wps@zuel.edu.cn

Abstract. With the development and application of new technologies such as big data, cloud computing, internet of things, and artificial intelligence, digital information technology has played a huge role in supporting and promoting economic and social development. At the same time, it also drives profound changes in the field of education. With the accumulation of teaching big data, the traditional online teaching platform is difficult to adapt to the new requirements under the new situation in the current wave of digital development. This study aims to explore the construction of “Internet +” teaching platform based on teaching big data to provide more accurate and convenient intelligent teaching services.

Keywords: big data teaching big data teaching platform

1 Introduction

With the development and application of new technologies such as big data, cloud computing, internet of things, and artificial intelligence, digital information technology has played a huge role in supporting and promoting economic and social development. The outline of China's "14th Five-Year Plan" puts forward that "we should meet the digital age, activate the potential of data elements, promote the construction of network power, accelerate the construction of digital economy, digital society and digital government, and drive the transformation of production mode, lifestyle and governance mode with the whole of digital transformation." [1] As an important part of the digital China strategy, the field of education has officially entered the era of digital transformation of education under the guidance of a series of relevant policies. [2]

Big data, represents a large scale of data. Compared with traditional data, people summarize the characteristics of big data into 5Vs: large volume, velocity, variety, veracity and value. [3]

Teaching big data refers to all kinds of data generated in education and teaching activities, including data collection formed by a continuous collection of teaching management, teaching resources, teaching process, teaching evaluation and so on. In addition to the characteristics of traditional big data, the data structure of teaching big data is more mixed. In addition to conventional structured data such as course selection,

classroom behavior records, and performance data, the volume of unstructured data represented by teaching audio and video and courseware resources is huge. The accumulation of big data in teaching provides a basis for the formation of a data-driven teaching paradigm. With the help of data mining and learning analysis technology, teaching data can be 'translated' into valuable information, which can provide more accurate, more timely and more comprehensive support for teachers' teaching decision-making and learners' learning decision-making, and promote data-driven precise and intelligent teaching and learning.^[4]

The online teaching platform is the software carrier of intelligent teaching, which not only provides the output of data but also can analyze the data and feedback for education and teaching. At present, there are many problems in the construction and use of online teaching platforms in colleges and universities. With the continuous accumulation of teaching big data, the disadvantages of the platform are becoming more and more obvious. The data processing ability is too weak to meet the new requirements under the new form of the current digital development wave. Therefore, this study aims to explore the construction of an "Internet +" teaching platform based on teaching big data to provide more accurate and convenient intelligent teaching services.

2 The problems to be solved and the construction goals of the "Internet +" teaching platform

2.1 Problems existing in the construction of online teaching in colleges and universities.

There are too many teaching platforms and a lack of a unified learning portal. With the accumulation of years of construction, the problem faced by many schools is not that there is no online teaching platform, but that the platform is too many and complicated. Different platforms have different login entrances, and mobile terminals are also different. The messy platform has brought a lot of management problems and also caused a lot of inconvenience to teachers and students. Teachers, students and teaching managers need to shuttle across multiple platforms, which consumes a lot of teaching, learning and management costs.

Teaching big data lacks governance and analysis. Teaching big data, especially unstructured teaching materials, video and audio data, and teaching process data generated by online teaching platforms and smart teaching tools, have rarely been governed by universities. The existing teaching data analysis is also limited to the data display within the platform, and there is no comprehensive multi-platform analysis of the teaching situation, which is difficult to reflect on the current teaching situation.

Lack of students in school learning life cycle presentation. The students' learning situation at school is scattered among various systems and platforms. The course selection and performance data are in the educational administration system. Different courses use different teaching platforms or tools according to the teacher's choice. The research activities, library borrowing and awards are scattered in the corresponding

business system. The data is not shared and presented. It is difficult for students to establish a clear portrait of their learning activities at school.

Lack of support for teachers' professional development. The professional development of teachers is the basis for the construction of high-quality development of education. How to find potential excellent teachers and problem teachers is the key to realizing the construction of high-level teaching staff. Although the traditional online teaching platform has accumulated a large amount of teaching data, there is no overall horizontal comparison and a lack of teaching analysis. It is difficult for teachers to objectively evaluate their advantages and disadvantages, and can not support the professional development of teachers.

2.2 Platform Construction Goals

The “Internet +” teaching platform is based on the collection, multi-source data integration, calculation and analysis of the teaching big data generated by the school's existing teaching management platform, online teaching platform and intelligent teaching tools. It is a teaching platform that integrates learning portals, teacher and student portraits, leadership cockpits, personal resource centers and other functions.

The design is carried out from the perspectives of teachers, students, managers and alumni. The basic idea is to integrate the existing teaching management platform, online teaching platform and intelligent teaching tools of the school based on the teaching big data middle platform, sort out the teaching big data, construct the integrated learning portal, and realize the unity of entrance, data and resources. After logging on to the platform portal, you can single sign on and jump to the third-party teaching platform to realize data synchronization and curriculum synchronization with the third-party platform. Based on the platform, teachers can carry out unified management of curriculum and teaching application; students can learn independently and realize the effective integration of all learning data; managers can manage the data of each teaching platform in a unified way to understand the online teaching situation of the whole school.

3 The functional design of the “Internet +” teaching platform

The platform mainly includes the following functional modules:

Main module of integrated learning portal: the portal integrates all teaching platforms, teaching management systems and related information related to school, teaching and learning. The entrance integration of each teaching platform, teaching tools and teaching management system is carried out to solve the problem of multi-platform teaching and learning between teachers and students. It is divided into four roles: teachers, students, managers and alumni, and the corresponding pages are displayed according to the user roles.

E-learning file module: taking the student as the unit, permanently store the data of students' course selection, scores, performance points and other data in each teaching management platform, the learning data of each teaching platform, including classroom performance, interaction, test scores and other all process and result data, form students'

classroom data, curriculum data, result data, overall data report, support personalized export service.

Electronic teaching archives module: taking teachers as the unit, according to the data of teachers in the teaching management platform and teaching platform, the online teaching archives of teachers are formed, such as the construction of teaching resources, the organization of teaching activities, the evaluation of teaching by students, etc., and the overall data report is formed.

Leading cockpit module: it is a visual display of teaching data. From the overall situation of online teaching, courses, resources, teachers, students and other dimensions, the display includes the number of online courses, the number of online classrooms, teaching activities, the number, distribution and use of teaching resources, etc., and sets up statistics, queries and analysis methods for different dimensions of the whole school, departments, classes, courses, teachers and students.

Other modules: the platform also includes other functions, such as online course patrol, personal resource cloud disk, notification sending and receiving, etc.

4 The architecture design of “Internet + ” teaching platform

The platform builds a fusion learning portal and other applications based on the collection, storage, analysis and processing of teaching big data. Combined with the previous functional requirements, the architecture design of the platform is shown in Fig. 1.

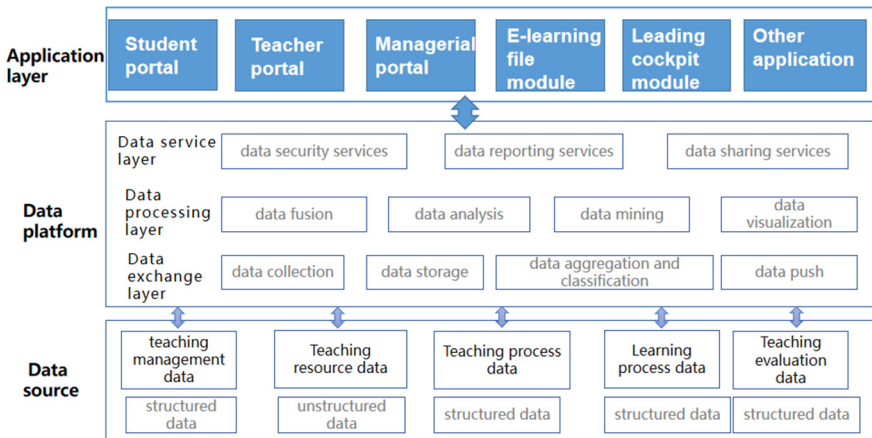


Fig. 1. the structure of the “Internet +” teaching platform

4.1 Data source

Teaching big data is divided into four types according to the source: (1) teaching management data, including student status data, course selection data, etc., which are generally stored in relational databases in the form of structured data; (2) Teaching resource

data, including teaching courseware, teaching video and audio data, are generally stored in the file system in the form of unstructured data; (3) Teaching process data, including teachers' teaching process data and students' learning process data, such as the process data generated in the teaching process, such as roll call, question answering, discussion test and so on; (4) Teaching evaluation data, including teaching results data such as grades and credits.

4.2 Data platform

The data platform is an architecture of the data interface. The data is copied from the application interface through data technology, and then the data is calculated and processed to provide a unified standard and caliber support for the upper data application. [5] It can be understood that the data center is a service center for collecting, processing, analyzing and providing data sharing for teaching big data, which is divided into data exchange layer, data processing layer and data service layer.

Data exchange layer: including data collection, data storage, data aggregation and classification and data push. Docking the school data sharing and exchange platform, on-demand access to student data, teacher data, educational data, curriculum data and other school basic data, collect and integrate various types of data such as process teaching and learning, teaching resources and other data of multiple teaching platforms used by school teachers and students, and select different storage methods according to data types.

Data processing layer: including data fusion, data analysis, data mining and data visualization. The collected data are fused, cleaned, analyzed and processed to form a more comprehensive teaching basic data information database. Use new algorithms and build new models for data mining and learning analysis, and deeply mine the underlying logic of various phenomena of teaching and learning.

Data service layer: including data security services, data reporting services and data sharing services. Provide targeted teaching data management and services for different roles, including teaching data docking management, data usage rights management, data custom analysis and other functions. Provide APIs for the docking of various business systems, realize the docking and preservation of third-party business system data, and realize unified management of business data.

4.3 Application layer

The application layer is a user-oriented front-end system, presents the main functional modules of the platform. According to the above function construction, it is divided into an integrated learning portal (including students, teachers, managers and alumni portal), e-learning archives, e-teaching archives, leadership cockpit, online patrol, personal cloud disk, notification transceiver and other modules.

5 Conclusion

The construction of the “Internet +” teaching platform has realized multiple platforms integration, data integration and resource integration. It has completed the one-stop login access of the online teaching and learning service of the whole school, provided a unified management mode for online teaching managers, provided better online teaching experience for teachers and students, and also provided a unified access standard and specification for the construction of intelligent teaching in schools, which has a positive role in promoting the implementation of education and teaching management.

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