Construction practice of digital curriculum resource library and platform for educational modernization

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Abstract: With the continuous development of education modernization, many colleges and universities at home and abroad have built a certain scale of smart classrooms, and realized the digital live broadcasting and recording of classroom teaching. These massive teaching video resources generated by daily teaching activities are the most important part of school-based teaching resources. How to gather and manage these resources and establish corresponding platforms to share and enhance their application efficiency and effect can effectively improve the teaching quality of schools. Taking the construction of education information platform in Changshu Institute of Technology as an example, this paper discusses the management and composition of course resource library and platform construction based on smart classroom, in order to provide reference for the construction of digital education resources in the industry.

Key words: education modernization, digital curriculum, resource platform

I. Overview

In the second decade of the 21st century, with the maturity of the new generation of information technology represented by the Internet of Things, cloud computing and big data, smart classrooms with smart technology, smart application and smart management have become a new construction hotspot in the field of education . Huang Ronghuai et al. believe that the nature of learning in the information age shows three changes: first, the status of learners in the learning process has changed from passive to active; Second, the learning process changes from memory-oriented knowledge mastery to discovery-oriented knowledge construction; Third, the process of knowledge acquisition from personal and mechanical memory to social, interactive and experiential . The construction of smart classroom is to adapt to the development of education modernization, and to create conditions for the realization of these three changes from the hardware environment. The smart classroom is different from the previous generation of multimedia classroom computer + projector + network mode, adding smart blackboard, supporting multi-layout desks and chairs, recording and broadcasting system and split-screen display and other equipment. Compared with the two, in addition to the teaching environment is more suitable for learning and the teaching equipment is more convenient to show the teaching content, the biggest change is that the teaching activities are recorded through the recording and broadcasting system, which makes the further research of teaching activities have a foundation. With the in-depth development of university information engineering, the focus of construction has changed from information infrastructure to information resource construction . In the past two years, Changshu Institute of Technology has intensified the construction of smart environment, built or rebuilt more than 120 regular recording and broadcasting smart classrooms, accounting for more than 50% of all public classrooms. Large-scale smart classrooms produce a large number of daily teaching videos. How to maximize the use of these resources, make them serve the digital transformation of education, and build a course resource library is the road Changshu Institute of Technology is taking.

II. The necessity of the construction of course resource library

The construction of teaching resource database and platform is the prerequisite of network teaching, which can realize the effective integration and highly sharing of teaching resources in colleges and universities, support creative teaching and inquiry-based learning, effectively improve teaching quality and level, and promote the pace of higher education modernization . The standardized teaching resource library has the following advantages.

1. Teaching objectives

In China, large-scale open MOOC platform and small-scale restricted SPOC platform are the two most common course platforms. The MOOC platform is suitable for open courses and is not closely related to school teaching. SPOC platform can realize the organic integration of MOOC and campus classroom, but the workload of teachers is large, the cost is high, and it is difficult to carry out regularly. The curriculum resource library based on smart classroom mainly takes teachers' daily teaching as the main content, supports the construction of the system from scattered classes to courses and majors, and is closer to the teaching goal of the school. In addition, the curriculum covers a wide range, and the construction process does not require a lot of human and financial investment, which has strong feasibility.

2. Support type

The Outline of the National Medium and Long-term Education Reform and Development Plan 2010-2020 points out that: Develop e-learning courses, innovate e-teaching models, update teaching concepts, improve teaching methods, and improve teaching effects ". Abundant online learning resources are conducive to the realization of students' independent learning, interactive cooperative learning, personalized learning and socialization of education. The recording and broadcasting system of the smart classroom can realize the online live broadcasting and recording of the class. On the one hand, when students cannot come to school normally, they can follow the original class to listen to the lecture, participate in attendance and complete the homework, without affecting the normal learning progress; On the other hand, recording and broadcasting resources and corresponding other teaching resources are also important references for the students

to review after class and review before the exam system; For the next students, the perfect course resource library is the main content of their independent learning in the flipped classroom; For other students in the university, they can freely choose the courses they are interested in and conduct cross-specialty micro-course certification; For the social staff, they can study their courses online and review them offline at the end of the semester, so as to change the way of adult education.

3. Quality evaluation

Teaching quality evaluation is an important means to test whether the teaching effect has reached the teaching goal, urge teachers to improve teaching work and enhance teaching quality . The curriculum resource bank based on the construction of smart classroom is the most authentic representation of teachers' daily teaching activities, and the construction of resource bank also accumulates a large amount of evaluation data for teaching evaluation. On this basis, activities such as course tour, lesson evaluation, data analysis and feedback are teaching quality evaluation in line with the actual teaching. The use of AI to improve the efficiency of supervision and auxiliary normal evaluation can solve the existing dilemma of more courses and less supervision.

4. Teaching display

The construction of the curriculum resource library reflects the teaching operation intuitively and vividly, and also produces a large number of teaching activity data. As the teaching management department of the school, the teaching big data is researched and analyzed, and multi-dimensional display is carried out around the curriculum disciplines and teachers, providing a basis for teaching management decision-making and teaching management intervention.

III. Curriculum resource platform

The construction of curriculum resource base includes two closely related links: the construction of resource content and the construction of resource platform. The construction of resource content is mainly completed through the smart classroom recording and broadcasting system, and the course center assists the construction. The construction of resource platform mainly includes curriculum center, supervision center and data center.

1. Recording and broadcasting system

The recording and broadcasting system is a part of the construction of the smart classroom. Its role is to convert the daily teaching activities of the teacher into audio and video signals to form audio and video files, which is the basis of the construction of the curriculum resource library.

The recording and broadcasting system is mainly composed of recording and broadcasting host, audio processor, HD camera, pickup and other equipment. The audio processor is responsible for collecting and processing the sound in the pickup, the smart blackboard and the teacher's laptop, and then transmitting it to the recording and broadcasting host. On the one hand, the video signal in the HD camera, the smart blackboard and the teacher's laptop is collected by the recording and broadcasting host. On the other hand, the audio signal transmitted by the audio processor is processed with the video signal collected by itself, and finally transmitted to the corresponding server for storage. The recording and broadcasting system mainly forms three kinds of pictures: teacher, student and smart blackboard. The teacher's picture mainly shows the teacher's teaching state, including formula deduction, concept deduction and other process display; The student picture shows the state of students in class, which is one of the bases for teachers and teaching supervisors to conduct teaching research; The smart blackboard screen is mainly used to show the PPT content of the teacher's lecture, and the single signal is to make the viewer of the course read the PPT more clearly. The recording and broadcasting system supports the intelligent connection between multiple shots, such as when the teacher is lecturing on the platform to show the teacher's near and middle view, when the teacher is in the middle of the student, the teacher automatically switches to the classroom panorama, when the student stands up to answer the switch to the student lens, when the PPT page shows a certain time of the blackboard lens. Through the later adjustment of the rules of the lens group, as well as the adjustment of the Angle and field of the teacher's and student's lens, the recording and broadcasting system can form a relatively perfect teaching video.

2. Construction of curriculum center

The curriculum center is a platform that carries the recording and broadcasting of the smart classroom, helps students to study and review, and assists teachers in teaching management. Its main functions are as follows:

(1) Course construction.

The teaching videos formed by the recording and broadcasting system are often stored by teachers or smart classrooms as labels, which are relatively scattered and not convenient for students to carry out systematic learning. Through data tools, the curriculum center extracts, transforms and loads the curriculum data in the teaching administration system to the curriculum center, forming a complete curriculum system containing the course name, the teacher, the class, the chapters and other information. This process does not need manual intervention, automatic release.

(2) Live recording and broadcasting

Students can check the live broadcast of the ongoing class according to the class schedule, and some students who cannot come to school can also learn simultaneously. After class videos are uploaded to the platform's curriculum system, students and teachers can view videos in their own classes for review or independent learning. In terms of learning support, the platform helps students listen to lectures and learn by OCR indexing PPT, taking notes on class videos, and recognizing and converting speech into text. In addition, all kinds of data left in learning activities, such as test results, learning time, learning process, etc., are recorded to the data warehouse, which is convenient for teaching statistics and management.

(3) Teaching management

The curriculum center provides teaching management functions for teachers. On the one hand, teachers can view and manage curriculum and lesson information, and also manage class members. In the teaching process, they can release and manage other teaching resources, assignments, announcements and so on through the curriculum Center. For students, the course can be evaluated.

(4) Statistics

The data statistics function of the curriculum center mainly includes three aspects: job analysis, learning statistics and grade management. Teachers can view the completion and equalization of homework in the form of charts; To understand the students' learning situation, such as the after-class review time of each class and the number of various notes; Manage students' homework submission rate, homework average score, offline scores and so on.

The curriculum Center has completed the whole process of daily teaching, without the need to mix multiple platforms, and has optimized the content, structure and interaction, making the platform more concise and easy to use, making it easier for teachers and students to get started, so as to better integrate it into daily teaching.

3. Construction of supervision center

With the goal of improving teachers' ability and curriculum quality, the supervision center consists of four links: course tour, course evaluation, feedback and reflection, forming a closed loop of supervision.

The center supports a variety of modes such as school, major and course Tours. The three warning rates of class attendance rate, head-up rate and front row vacancy rate are directly displayed on the center's home page, greatly reducing the supervision burden. In the course evaluation process, the center supports teaching management, supervisors, fellow teachers and students to make multiple evaluation subjects, and forms evaluation reports through multidimensional evaluation methods such as AI, scale and dot. The course data combined with the evaluation information of supervisors, peers and students will form a relatively comprehensive feedback information of the course, so that the evaluation is systematic and the guidance is precise. The support of feedback big data promotes personal reflection, and teachers can find the gap by horizontal comparison and determine the aspects they need to improve. They can also make a vertical comparison to see their progress and understand their own improvement progress (a period of data accumulation is required).

4. Data center construction

In the process of teaching and supervision, a large amount of data has been formed, including behavioral data, voice data, OCR data recorded by the recording and broadcasting system, resource viewing data of the course center, answer data, test data, and the use of classroom equipment data. By capturing these data to form the data warehouse of course resources, after data cleaning and summary, form all kinds of theme data and reports to help intelligent analysis.

The data center contains the real-time data Kanban function, which is convenient for the teaching management to understand the real-time teaching situation; It contains the function of management cockpit, showing the information of course quality, class and student learning status; It contains the function of curriculum portrait, showing the subject characteristics from different dimensions; It contains the function of teacher portrait, showing the teaching characteristics of different teachers in different layers and classifications.

IV. Conclusion

The construction of curriculum resource base based on digitalization conforms to the needs of school teaching objectives, covers most courses with less investment, and the teaching implementation and teaching management are in line with the development trend of modern teaching. At present, the school has the corresponding hardware facilities and software platform, and is actively practicing. In order to give full play to the role of the curriculum resource library, at the same time, it is necessary for teachers, students, supervisors and information teams to participate fully. In the future work, the information technology team will actively train teachers on the construction of course resource database, enhance teachers' ability and awareness of information technology teaching, set up a typical course construction, and drive the construction of our school's course resource database to go deep and solid. At the same time, it is hoped that the resource platform can provide reference for the digitization education construction of brother colleges and vocational colleges.

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