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The College Classroom Construction and Management under the Background of "Internet plus Education"

-Taking South China University of Technology as an Example

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***Abstract*—Since the promulgation of Education Informatization Decade Development Plan (2011-2020), the support environment of informatization education of universities in China has reached a large scale and good application results have been achieved. In this paper, through the analysis of the current situation and problems of current college curriculum, the classroom construction and management measures under the background of "Internet plus education" in Colleges and Universities are put forward. The application of the Internet thinking is to optimize the design and management of classrooms, which improves user experience and service quality for teachers and students in the classroom.**

Keywords—classroom; Internet+; Internet+education; learning space

I. INTRODUCTION

As external environment that influences learners' learning, learning environment is also an external condition to promote learners' initiative in constructing knowledge meaning and promoting the existence of their abilities [1]. Classroom is the main physical space of teaching and learning and different teaching strategies and models need support from different learning environment and learning space. There will be naturally more dialogues in classroom with a good user experience. Therefore, learning space itself is the premise, the hand and the foundation of education and teaching reform, so the change of space will naturally lead to the change of educational practice [2].

In the new period of Internet plus education, the Internet thinking should be implemented. And taking students as the center, mobile Internet technology is applied for reconstruction of management process optimization services to establish sustainable development mechanism and form a virtuous cycle of classroom construction, application and operation. Create wisdom classrooms with good user experience, which supports classroom teaching with different teaching strategies and mode, so as to make the construction of the classroom helpful to create good service and guidance, communication and cooperation between teachers and students, to promote the deep integration of information technology and teaching in classroom, then improve the quality of teaching and personnel cultivation.

II. THE CURRENT STATUS OF CLASSROOM CONSTRUCTION IN UNIVERSITIES:INFORMATIZATION TEACHING ENVIRONMENT HAS BEEN LARGE-SCALE

In 1999, the Ministry of Education officially launched the construction of the "985 Project" and a total of 39 high level universities including South China University of Technology were among them. After 17 years' construction, the university has achieved leapfrog development, strengthened and improved the construction of education information infrastructure and network system. The support environment of teaching informatization has been large-scale, which effectively supports the deep integration and innovation application of information technology and teaching.

A. Adequate Seat Amounts in Classrooms

Taking South China University of Technology as example, as of September 20, 2017, the university built 339 classrooms with computer, projection and other digital equipment, with a total seating capacity of 39,371, a total area of 45,174 square meters. There are 33 language laboratories, 1,972 study seats for students, with a total area of 3,457 square meters. As of May 2017, there were 24,885 undergraduates and 11,403 postgraduates, totally 36,288 persons. Every one hundred students are equipped with 111.25 seats in classrooms and voice labs, which meets the needs of the university's informatization teaching.

B. Supporting Various Teaching Forms

University usually has classrooms with computer and projection, language labs (computer labs), automatic lecture video recording classrooms, interactive whiteboard classrooms and tablet computer classroom. The classroom with computer and projection can support "delivery acceptance" teaching mode, especially for the basic teaching procedures of centralized teaching knowledge content and key points and difficulties reviewing and so on. The language laboratories are

used to support the acquisition of computer and analog operational skills as well as research learning or project-based learning and so on. Automatic recording classrooms support teachers' micro teaching and teaching evaluation and so on. Interactive whiteboard classrooms are suitable for content explanation of demonstration teaching and human-computer interaction. Tablets help to improve the interactivity of teaching.

C. The Using Result Is Good

There were a total of 217 students from South China University of Technology participating in the random sample survey and the survey data showed that: 80.45% of the students think that teachers can skillfully carry out multimedia teaching.

III. THE MAIN PROBLEMS EXISTING IN THE CONSTRUCTION AND MANAGEMENT OF CLASSROOMS OF UNIVERSITY UNDER THE BACKGROUND OF INTERNET PLUS EDUCATION

The purpose of "Internet plus education" is to apply Internet thinking, technology and mode to transform traditional ecological education, which realizes the structural change in education system [3]. Taking this core concept, the following problems lie in the construction and management of university classrooms.

A. Student Centered and Optimized Service Awareness by Process Reengineering Still Need to be Further Strengthened

The intervention of education informationization must cause structural changes, therefore reform and innovation of service and management in "Internet plus education" era is needed. At present, classroom reservation, equipment failure repair and other services still need more human intervention. The service consciousness taking informationization process reengineering to optimize services and taking teachers and students experience as the center still needs to be strengthened further.

B. The Long-term Mechanism of Application and Guarantee Needs Improvement

The university has paid a lot of investment in education informatization, but capital investment is insufficient and investment mechanism is not perfect. The unimproved operating mechanism may lead to the problem of poor running and poor management performance. Whole planning and overall planning is not enough to support sustainable development.

C. Lacking Support for Mobile Teaching

The university still lacks of classrooms that can support the flipped classroom learning, group discussion, individual learning and teaching in small classes, mobile learning with classroom chairs (which can support different number of members in group for discussion), classrooms that can support BYOD (Bring Your Own Device), such as portable computer, mobile phone, IPAD, mobile phone, WIFI and enough socket etc. Mobile learning classrooms with IPAD (a IPAD for each student), interactive e-whiteboard classroom (replace the projector and electronic whiteboard are used as intelligence classrooms with interactive function, which could support course of personalized learning content and real-time interactive evaluation on tablet computer. The fusion of class environment and teaching process shows deficiencies, which is difficult to enhance students' learning experience better.

Therefore, in order to promote the development of intelligent learning in classroom environment, enhance learning effect, reinforce learning experience, promote personality development, deepen teaching reform, the optimization of the classroom environment and information management is imminent.

IV. THE COUNTERMEASURES OF COLLEGE CLASSROOM CONSTRUCTION AND MANAGEMENT UNDER THE BACKGROUND OF INTERNET PLUS EDUCATION

A. Optimize classroom service process

Optimizing classroom service process can enhance the classroom experience of teachers and students better. For example, in the process of this research, there are teachers reflected trouble shooting is insufficient. The development of two-dimensional code and classroom repair system based on intelligent mobile phone was developed by research team, to reengineer information process and business design.

Teachers could use WeChat on mobile phone to scan the two-dimensional code which was stamped on the platform in each classroom. Then teacher could input and select the pre-function for the equipment and the corresponding fault type to complete the report of classroom fault on the popping page. It not only simplifies the process, reduces the time cost of teachers' warning, but also is easy to accumulate fault data, which provides a reference for the construction of optimal management afterwards to optimize management and improve service.

B. Form a Virtuous Circle of Construction, Application and Operation

The vision of the development and the application of digital learning resources are to promote teaching and learning with reasonable and effective application of information technology. To realize this vision and to ensure a virtuous circle of the construction, application and operation and formation of sustainable and systematic funding investment mechanism, the strategic position and the investment strategies of education informationization should be set up, conventional and unconventional funding support should be established, adequate customer service should be purchased along with equipment.

C. Learning Space Design Based On Users' Experience

Learning space should be provided of high quality users' experience for teachers and students [4-5]. The facilities should be simple and easy to operate in learning space. In addition to the intervention of technology, we should also pay attention to furniture, space layout and other physical environment on space planning and design.

Henshaw and other people believe that the learning space with rotatable desks and chairs can promote the interaction between teachers and students and the transformation between three teaching methods, such as teaching, classroom discussion and group cooperative learning [6].

At present, most of the desks and chairs in universities are fixed, which is not conducive for the communication between teachers with students. Different classroom layout can arrange different learning activities and educational practice and flexible interior layout and seating is convenient for students to participate in classroom teaching activities. Bright, modern office facilities can arouse students' professional sense of excitement. The seat design in accordance with human body engineering architecture, convenient furniture, mobile, can be combined in group with 3-5 students sitting together. Even back to the teacher, classroom interaction will be carried on mobile learning devices and multi wall display that can also ensure the angle of teaching, discussion to adapt to different needs. The connection of the desk adopts double fixed strong magnetic paste, buckle and so on, and it can be arranged as U shape, horseshoe shape, back shape and so on. Electronic wiring and cabling which were hidden in the floor or table can easily support student's terminals like flat panel, notebook, and mobile and so on.

D. Application of Environment Sensing Technology Realizes Dynamic Monitoring

RFID (Radio Frequency Identification), two-dimensional code, video monitoring and other environment sensing technologies and equipment has been used in the campus security, energy conservation, scientific research and teaching etc. for real-time dynamic monitoring and control of campus physical equipment. For example, RFID technology will be integrated into the campus cards, multimedia equipment and personnel management which were used in the classroom, intelligent attendance, anti-theft positioning of expensive equipment, laboratory control, lighting, ventilation, air conditioning system control and energy saving control etc..

E. Teaching Research under the Support of Automatic Video Studio

Video studios were usually equipped in university. Taking South China University of Technology as an example, there are 15 video studios with automatic video recording. Multiplex video signal which includes teachers, students, teachers screen, students screen signals and video screen, etc. were formed into a single screen video, two screens video or three screens video to support the following teaching research.

(1) Remote interaction across campuses. With the development of video technology, campus teaching boundaries become fuzzy. Recorded broadcast system and broadcasting system which docking network learning platform is used to develop course video resources, support classroom interaction in multi-site interactive and remote teaching and teleconferencing. Docking data from the interactive function of group teaching and screen control were integrated into and analyzed in the network learning space.

(2) The lecture videos which were automatically shot by video studio were uploading to the learning space as the course resource under the consent of the teachers. It could facilitates students after-school review, also provides the records for the steering group to make the teaching process evaluation.

(3) Teachers record and save the teaching video by themselves, make self-examination and self-evaluation of teaching process and make self-diagnosis in the form of microteaching.

(4) Build up young teachers' teaching video files. The whole video follows the whole course of young teachers, make self-examination through the video and get instruction from the famous teachers. The effective teaching diagnosis platform is built via this method.

(5) Set up the live video classroom for the development of teachers' teaching ability and teaching skills contest and hold young teachers contest to form the video database. Through the selection and training, teaching and curriculum evaluation, the game teaching training process integration, it builds a mutual exchange of learning to enhance the teaching ability in the demonstration platform for all young teachers.

F. To Promote the Reform and Innovation of "Internet Plus Education" with the support of the Wisdom Classroom

After the "985 Project", the Ministry of education proposed the Double First-rate program in February 2016 to accelerate the construction of world-class universities and first-class disciplines. The construction and application of intelligent classroom can provide a higher platform for the innovation and reform of information technology, promote the deep integration of information technology and curriculum, and promote "double class" construction in colleges and universities.

In terms of the hardware, smart classrooms have high-speed wireless network, multi-display, cloud services platform, global mobile, movable and combinable the tables and chairs, intelligent sensor and virtual simulation device which can sense the air, temperature, light, sound, color, odor and other environmental physical factors and learning behaviors. It is convenient to obtain resources and access equipment. It has a good ability of teaching materials and information presentation. The content can be clearly presented in a way that fit the cognitive characteristics of learners well and reinforce the learning's understanding and processing to the learning materials [7].

In the software system, mobile classroom control platform which based on cloud technology were used. Administrators and teachers use IPAD or mobile phone to directly connect the management center through the wireless network. It helps to establish a more extensive and a freer space management to improve the flexibility, interactivity and efficiency of classroom management. Separately display screen with more interactive technology were used to support the deep teaching interaction. Large data acquisition and analysis technology were used to collect and analyze learning behavior statistics, such as before class learning behavior, asking and answering on class, interaction, naming etc. It helps teacher to find out the difficulties and problems of student's learning. The learning scene recognition system identifies learning situation types, diagnosis and predicts learners' learning needs based on the available context information and sensing information, to enable the learners to acquire personalized learning resources, connect learning partners and accept the effective learning activities suggestion.

V. SUMMARY

The 2017 Horizon Report (Higher Education Edition) predicts that in the next 3 to 5 years, redesigning the learning space will be the focus of higher education [8]. Learners' learning space has expanded from limited physical space to more open and flexible network space. The redesigned educational environment will support project-based interactions with greater mobility, flexibility, and the use of multiple devices. We should reconstruct the classroom so as to reconstruct learning, and use cloud-based mobile applications and big data analysis to well connect physical space and virtual space, and avoid the Low learning with High technology [9].

Future learning space will become more and more diverse and learning space will become more personalized and immersive. Under the guidance of user-oriented and decentralized Internet thinking, we should think about the following question. What is the value of each item in the classroom? What exactly will the systematized equipment bring to our students and teachers? The construction and application of the classroom will help to build up the good teacher-student relationship with good service, guide, well communication and cooperation, promote the deep integration of information technology and the classroom and promote the quality of teaching and the quality of personnel cultivation.

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