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Opportunities and Challenges of "Internet +" to University Mathematics Teaching

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***Abstract*—This paper addresses the serious problems that today's "Internet + smartphones" bring to college mathematics classroom teaching. From the actual situation of higher mathematics classroom teaching in our school, the opportunities and challenges of college classroom teaching under the background of "Internet +" era are analyzed. The research attempts to implement the reform of higher mathematics classroom teaching in our school by using the wisdom teaching tool "rain classroom". It explores the use of information technology (Internet), with mobile terminal equipment (smart phones), tailor-made, intelligent, and adaptive open, democratic and efficient mathematics classroom learning mode for application-oriented undergraduate students.**

Keywords—Rain class; University mathematics; Classroom teaching

I. INTRODUCTION

The "Internet +" era is changing every aspect of people's lives, from information technology, communications, transportation, the economy, and even to the literary and art fields that seem to have nothing to do with it. Once the Internet and many industries are combined, it has produced a shocking 'chemical reaction' that has spawned new development concepts and models [1]. On March 5, 2015, Premier Li Keqiang, the Premier of the State Council, solemnly proposed the "Internet +' Action Plan" in the "Government Work Report" of the Third Session of the 12th National People's Congress [2]. Since then, "Internet +" has become a hot topic. On April 23 of the same year, Li Keqiang pointed out during the inspection in Fujian that the "Internet +" unknown is far greater than the known, and the future space is infinite; every point of exploration of water accumulation will inevitably affect and reshape the traditional industrial industry pattern [3]. As a very important part of human society and individual life, education industry can certainly not avoid the comprehensive, significant and profound impact brought by "Internet +" [1]. As a university teacher who shoulders the heavy responsibility of national education, we have no reason to take a cold-eyed attitude in front of things that affect the times.

II. CHALLENGES AND OPPORTUNITIES FOR TRADITIONAL MATHEMATICS TEACHING MODELS

In the applied undergraduate talent training system, advanced mathematics knowledge is basic and plays a role of instrumentality, which plays an invaluable role in promoting and promoting students' follow-up professional learning. However, the serious fact that is faced in the traditional mathematics teaching process is that students can't use all their energy in mathematics learning. The reasons are manifold. But the main reason is the enormous challenge brought by the era of "Internet smartphones" to college mathematics classroom teaching. "Internet smart phones" infiltrated into university campus life - dorms, study rooms, restaurants and even classrooms, "low-headed people" can be seen everywhere, students can not resist the temptation of the virtual network world, do not bring textbooks with books, every few minutes Brushing Weibo, WeChat, circle of friends and even playing games in minutes seems to have become the regular action of today's college students in the classroom.

A. *The challenge that teaching subjects bring to traditional classroom teaching*

The "people-oriented" theme of the times and the "three everything" concept of running a school in Xijing College are the basic starting point and the foothold for all our teaching activities. The primary task of all teaching activities is to study the main body of the teaching activities - students. Most of the contemporary college students were born in the mid-to-late 1990s. They are typical "digital indigenous peoples" who grew up in an information environment and recognized by information technology as "digital indigenous" and "digital immigrants". The influences of knowledge, learning attitudes, study habits, and behaviors are completely different. This is the high-frequency vocabulary "generation gap" that people are talking about today. This "generation gap" shows that the biggest challenge facing education today is that teachers and students, parents and children do not understand each other, and it is difficult to communicate and ultimately lead to the optimization of educational effects [6]. In addition, the "generation gap" caused by the weak mathematics foundation of private college students, the different degrees of fear and rebelliousness of mathematics and the poor self-control ability of learning are more difficult to overcome. Therefore, as a front-line worker of "digital immigration", there is an urgent need to change educational concepts, improve information literacy, and study the teaching model of advancing with the times in the context of the "Internet +" era.

In the process of researching teaching mode and designing teaching activities, we should fully consider that our education objects in the middle school mathematics curriculum are full of inferiority and frustration. Although they are trying hard to start

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again, they are really there. In the university mathematics class, when the required elementary mathematics knowledge can't be connected, they will begin to review the relevant knowledge of the previous middle school, ask the teacher, and the students to discuss, but unfortunately, most of the students feel after repeated several times. It's too difficult to learn and finally give up. In the face of such objective facts, we must be patient as educators, give them care of love, and cultivate their confidence in learning advanced mathematics [7].

B. *Opportunities and challenges facing education in the context of "Internet +"*

The arrival of the Internet + era has brought great opportunities to the education industry. From a macro perspective, on the one hand, "Internet + education" breaks the time and space constraints of education, and students can realize ubiquitous learning at any time. The emergence of a new generation of emerging technologies such as big data has made students' learning more personalized, adaptable and intelligent. On the other hand, the various "Internet + education" models that have emerged in recent years have also greatly affected the traditional teaching mode. Many scholars and schools have begun to explore new teaching models that adapt to the trend of the times, and hope to inject them into teaching. Fresh vitality, improve students' interest in learning and learning effects [6]. At the same time, "Internet +" is changing the traditional educational ecology, and will re-construct the educational ecology in line with the trend of the times, making the form of education more diversified and the system more flexible [6-8]. From a micro level, "Internet +" makes the curriculum system, teaching and learning methods, evaluation methods, etc. in the school teaching change significantly, and must be attached to the era of "Internet +". "Internet +" brings great challenges to education, but it also brings great challenges. There is no doubt that this new thing that affects the transformation of the times is to use the double-edged sword as the vanguard of higher education. What we need to do is to foster strengths and avoid weaknesses, avoid disadvantages, and play its active role as much as possible to minimize its negative effects.

III. New Thinking and New Path of Higher Mathematics Teaching Reform

In the application-based undergraduate talent training system of our university, higher mathematics as a professional basic course plays an important role in promoting and promoting students' follow-up professional courses. For more than ten years, our teaching and research team has been working hard to improve the quality of mathematics teaching, to focus on students, to stimulate students' interest in learning, to improve students' learning and satisfaction, and to serve the applied undergraduate talents of our school. The characteristic education mode is the fundamental starting point of all our teaching and research activities.

A. *Implementing the foundation of higher mathematics teaching reform*

- The campus wireless network coverage, multimedia classroom popularization, smart classrooms, open labs and other first-class hardware facilities provide a strong hardware guarantee for the implementation of the "Internet +" background teaching reform.
- In the construction of an excellent course for the application of undergraduate talent training, the team has built a course based on the higher mathematics of economics and management (the calculus <volume Ⅰ>) is building a course (the calculus < Volume Ⅱ>). These high-quality course resources provide reliable and substantial software resources for our teaching reform in the context of "Internet +".
- The teacher re-education system on the eve of the winter and summer vacations makes every first-line teacher have the opportunity to study and research advanced teaching tools, teaching concepts and teaching methods at home and abroad.
- According to the "Rain Classroom", teachers can use MOOC to send MOOC videos, documents, web pages (learning tasks, goals, pre-class materials, and after-school exercises) to the students' mobile phones in real time, and customize them to suit their teaching style and teaching rhythm. The function of instructional design is to design and produce the economic resources of high-level mathematics courses for the teaching of "rain classroom", including offline resources: courseware for teaching activities; online resources: pre-class preparation (micro-course video, project-based teaching) Case), homework (exercise, thinking questions, small papers, experience, etc.).

B. *A new way of implementing the reform of higher mathematics teaching - wisdom classroom*

"Rain Classroom" is a new technology for teaching jointly developed by Xuetang Online and Tsinghua University. It is a hybrid teaching tool launched through the MOOC platform "School Online" [8]. "Rain Classroom" is to install an enhanced plug-in for PPT, integrate information technology into PowerPoint and WeChat, establish a communication bridge between extracurricular preparation and classroom teaching, and realize the function of letting classroom interaction never go offline [9]. "Rain Classroom" scientifically covers every teaching session before, during and after class, and basically realizes the teacher's data collection for the whole cycle of teaching, from pre-class preparation, classroom interaction, after-school homework, etc. The teacher analyzes the course data, quantitatively analyzes the students' learning situation and precise teaching, and provides a perfect solution for the teacher-student interaction in the classroom teaching process.

The emergence of "Rain Classroom" successfully transformed "Internet + Smart phone" into a tool for learning, which brought the gospel to universty teaching. The "Internet + Smartphone" teaching model with the "rain classroom" as the link will greatly change the current educational ecology, making the form of classroom teaching diversified and flexible. This kind of teaching mode makes the epoch-making changes in the course content, teaching methods and evaluation system

in the university mathematics teaching activities, which brings great opportunities to mathematics teaching and brings great challenges.

C. *New Measures to Implement Higher Mathematics Teaching Reform—Rain Classroom Teaching*

- Taking the advanced mathematics of the application-oriented talent training target as the basic starting point, the new technology "rain classroom" in the era of "Internet +" is used as the technical support, and the theoretical content system of higher mathematics is based on the "rain classroom" technology. The theoretical basis, implementation conditions, teaching objectives, teaching process and teaching evaluation are carried out in five aspects, and efforts are made to build a mathematical wisdom teaching model that can stimulate students' enthusiasm and interest in learning and is suitable for applied undergraduate colleges.
- Based on the information-based smart classroom, focusing on the application of information technology, emphasizing the deep integration of information technology and classroom teaching, aiming at constructing a humanized and intelligent modern classroom environment, thus promoting the development of students' wisdom [10]. We should carefully study and analyze the components of the smart classroom structure in terms of theoretical basis and implementation conditions, and then construct a mathematical wisdom classroom teaching model based on the components of the smart classroom, and design teaching activities according to the actual situation of our school. The teaching activities in the wisdom teaching mode mainly refer to the integration of online activities and offline activities. The online activities refer to the teacher-student interaction activities generated by the relevant wisdom teaching platform, and the offline activities are mainly classroom teaching activities. Make full use of the “Rain Classroom”. Teachers can use the WeChat to push the pre-study materials with MOOC videos, exercises and voices to the students' mobile phones in real time, and customize the functions that match the teaching style and teaching rhythm of the instructors to design and use. Learning resources for high-level mathematics courses in the “Rain Classroom” teaching, including offline resources: courseware for teaching activities; online resources: pre-class preparation (micro-course video, documents, pictures, voice, web pages), after class Homework (exercise, thinking questions, small papers, experience, etc.).
- The reform of teaching mode must be accompanied by the reform of the learning assessment method. The intelligent teaching evaluation is divided into online evaluation and offline evaluation. The data generated by the teaching process is collected in an all-round way, making the teaching evaluation more scientific, humanized and intelligent. According to the “Rain Classroom” class sign-in, real-time answering, and barrage interaction function, do a good job of data collection during the whole period of teaching, including course data, quantitative analysis of students' learning, accurate to people, and then combine the performance of online and offline activities. Formulate a multi-curricular assessment program that is objective, human, and scientific, and change the current college mathematics curriculum assessment as soon as possible, and the teacher’s headache is awkward.
- According to the “Rain Classroom” class sign-in, real-time answering, and barrage interaction function, do a good job in the data collection of the whole cycle of the teaching, including the course data, quantitative analysis of the student's learning situation, accurate to people, and then combine the performance in online and offline activities. Formulate a multi-assessment program for humanized courses.

IV. Conclusion

The essence of "Internet +" is "network + reality wisdom", which needs to integrate the network with the depth of reality to create new things. The wisdom teaching activity of "Internet +" and "rain classroom" is aimed at cultivating the innovative thinking and innovation ability of college students in the new era. How to deep integration of the two has a long way to go, and we need teachers who work in the front line to take time. And the energy is really on the teaching. Constantly researching and innovating teaching methods, truly forming an atmosphere and air of teaching and learning.

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