A Smart Online and Offline Synchronization Teaching Mode Based on the Rain Classroom Software
Taking College English Courses as an Example

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Abstract

Smart teaching environment is constructed by many intelligent teaching platforms. From the perspective of technical architecture, these platforms can be divided into user layer, terminal layer, application layer, platform layer and network layer. After constructing the basic environment of intelligent teaching environment, it is necessary to select the appropriate application layer teaching software according to the needs of students and the characteristics of course teaching. Therefore, from the perspective of College English teaching, this paper deeply analyzes the application of application layer software in traditional teaching and intelligent teaching environment. Because some students need to take classes in different places during the COVID-19 epidemic period, an online and offline synchronous hybrid teaching mode is designed. In order to demonstrate the specific application of this model, taking College English teaching as an example, a teacher-student interaction process with the Rain Classroom software as the core is designed in three stages: "pre class", "during class" and "after class". In addition, it analyzes the defects of using Rain Classroom + Tencent Meeting as the smart teaching software platform, as well as the follow-up improvement strategies.

Keywords: *Smart Learning Environment; Smart Teaching; Synchronization Teaching; Teaching Assistant Software; Rain Classroom*

1 INTRODUCTION

At present, the rapid development of Internet of Things, mobile communication, Big Data, cloud computing, artificial intelligence and other technologies has promoted the arrival of the era of smart education. The essence of smart education is to use the latest technologies such as data collection, teaching assistant software, Internet communication and intelligent analysis technology to build various information-based education platforms and interactive teaching tools, promote the renewal of educational ideas and teaching means, and build an intelligent, humanized, interactive and timely feedback intelligent teaching environment. Intelligent teaching is an important part of intelligent education. It emphasizes the use of information technology to promote the change of teaching scene, teaching resources, learning environment and teaching mode. The characteristic of smart teaching is to take students as the center, build humanized and intelligent online and offline teaching scenes, and pay attention to students' feedback and experience in the whole learning process [3].

Smart teaching is learner-centred. Students' access to knowledge from the Internet is becoming more and more convenient. MOOC (Massive Open Online Courses), SPOC (Small Private Online Course), various databases and network groups have become the sources of students' access to comprehensive, systematic and in-depth knowledge. Teachers' lectures and paper books are no longer the main sources of students' knowledge. The traditional role of teachers in the classroom has been weakened. Teachers rely on various online teaching software or platforms to provide students with relevant extracurricular materials, test exercises, and links to MOOC. Through software and platforms, students' attendance and reading are recorded, and students' feedback, questionnaire survey and learning situation analysis are collected. Students can more intensively and quickly obtain information, conduct online self-test, analyze their academic strengths and weaknesses, and communicate with teachers anytime and anywhere. Therefore, smart teaching put more emphasis on students' learning experience and feelings, and it is easier to quantify the learning effect.

In order to build a smart teaching environment, many smart teaching platforms have been proposed [5]. From the perspective of technical architecture, these platforms can be divided into user layer, terminal layer, application layer, platform layer and network layer (as shown in Figure 1). The user layer includes platform users (teachers and students) and platform managers. The terminal layer includes all kinds of smart terminal devices (such as smart phones, PCs and cameras) used to access the smart education platform. The application layer includes various software systems (such as Rain Classroom, Tencent Meeting, Treenity, WeChat Work/WeCom, QQ, etc.) built to meet the learning and teaching needs of different levels. The platform layer consists of various intelligent education cloud platforms, educational resource sharing platforms and big data platforms, which are used to provide educational resources and conduct teaching behavior analysis. The network layer is the infrastructure of the intelligent teaching platform. It provides access services to the Internet, campus network, mobile communication and other networks. For teachers, after the basic environment of the intelligent teaching environment is built, they need to select the appropriate application layer teaching software according to the needs of students and the characteristics of course teaching. Therefore, from the perspective of College English teaching, this paper makes an in-depth analysis of the use of application layer software in the traditional teaching and intelligent teaching environment.
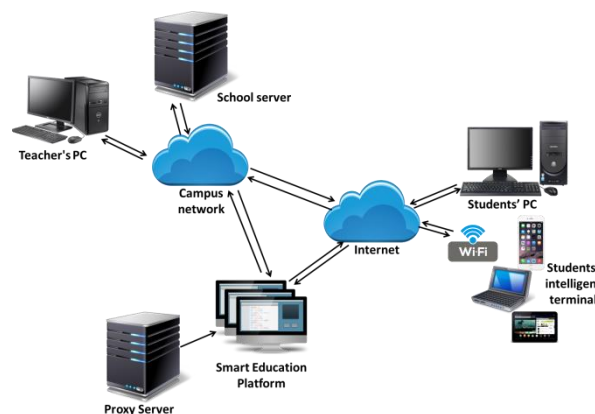

Figure 1: Typical network architecture of an intelligent education platform

In the traditional classroom, teachers mainly use multimedia for teaching, and the software used is PowerPoint and Windows Media Player. In the smart teaching environment, in addition to the teaching software used by multimedia, this paper uses Rain classroom and Tencent Meeting as the main software to build the smart teaching platform, and compared the two teaching methods from the stages of before, during and after class(as shown in Figure 2).
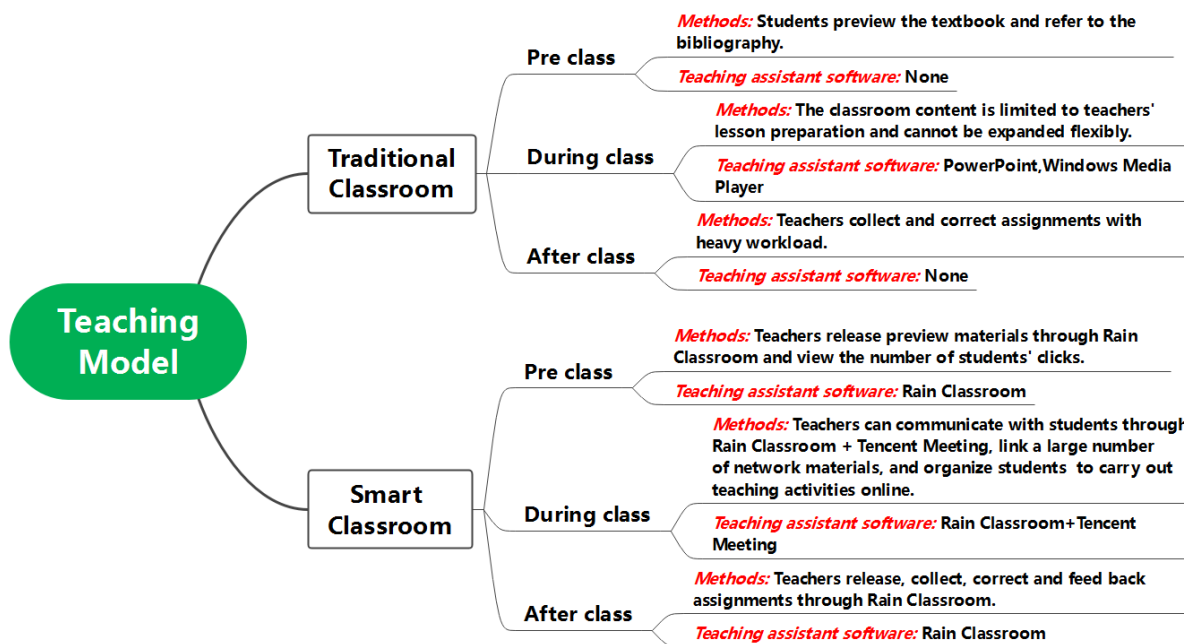

Figure 2: The difference between traditional classroom and smart classroom

1.1 Related Studies

In recent years, in order to overcome the defects of traditional teaching mode, many scholars have carried out in-depth research around the construction of smart teaching environment, the development of smart teaching software and the application of interactive teaching aids such as Rain Classroom. Wang analyzed the functional characteristics of Rain Classroom software in the following aspects: slide function and student feedback, classroom exercise response system, courseware push to mobile phone, classroom discussion based on bullet chat

function, and data collection and analysis. In addition, it also summarizes the teaching concept innovation and actual operation of Rain Classroom software [7]. Zhang & Yang divided intelligent teaching tools into four categories: presentation, collaboration, management and interaction, and put forward strategies for using intelligent teaching tools to promote classroom teaching effects [9]. In order to improve the teaching effect of basic computer courses in universities, Liu & Sun proposed a method of using intelligent teaching tools to record students' learning process and evaluating students' learning effect based on Big Data analysis technology. In the application of intelligent teaching tools, Liu & Sun tried teaching aids such as Rain Classroom, Superstar learning APP, Mindmaster, etc. [1]. Zhang designed an intelligent experimental teaching system based on Java language, information transmission technology and artificial intelligence technology. The system realizes the functions of intelligent face recognition, dynamic update of experimental courses, automatic acquisition of experimental data and intelligent experiment assistant [10]. Niu made a comprehensive comparison among many popular smart education platforms, such as smart teaching, smart learning, smart management, smart research, smart evaluation, etc. At the same time, in view of the problems existing in the existing platform, a new intelligent education platform scheme is proposed, including the overall hierarchical structure, the network environment after the festival and the functional design architecture [5]. Liu et al. analyzed the characteristics of the information platform under the intelligent teaching environment, and proposed an information platform architecture based on "infrastructure layer + platform service layer + software service layer + customer service layer" [2]. Li took the course of probability theory and mathematical statistics as an example to carry out the teaching practice of integrating traditional classroom and classroom interaction software, and used Superstar learning APP and Rain Classroom as classroom interaction software to fully mobilize students' interest in learning and enthusiasm for participation [4]. Wan & Liu analyzed the problems existing in the construction and use of the current intelligent teaching cloud platform, and proposed the overall structure design and software architecture design of the new intelligent teaching cloud platform [6]. Wu et al. pointed out that although experiments of electronics and electrical appliances can be simulated and tested by virtual instruments with the support of software, students lack the understanding of actual components and circuits. Therefore, a new intelligent experiment teaching system is designed based on the software tools of Rain Classroom and lab of electronics intelligence and portable hardware [8].

1.2 Our Contributions

In view of the fact that not all students can attend school during the epidemic period, this paper has focused on the following issues: 1) Online and offline classes can be synchronized through the smart teaching mode. 2) We can make full use of the function of "Rain Class + Tencent Meeting" to save teachers' repetitive work in the traditional classroom. To this end, we have implemented the online and offline interactive teaching reform with the Rain Classroom software as the core, and the specific contributions are as follows: 1) Combined with the actual situation of our college, this paper has made a technical demonstration on the selection of smart teaching software and platform. 2) The online / offline teaching process based on the Rain Classroom software is proposed, and the teacher-student interaction based on Rain Classroom is designed in detail in three stages (i.e. pre class, during class and after class). 3) This paper analyzes the limitations of the Rain Classroom software, and puts forward some strategies to further improve the teaching effect under the background of smart teaching.

2 ONLINE / OFFLINE SYNCHRONIZATION TEACHING MODE OF COLLEGE ENGLISH COURSE BASED ON THE RAIN CLASSROOM SOFTWARE

2.1 Selection of Smart Teaching Software and Platform

There are a variety of information-based teaching tools with different functions for smart teaching. Many teachers are used to teaching with several tools. Common teaching tools include Rain Classroom, Tencent Meeting, Treenity, WeChat Work/WeCom, QQ, etc. All kinds of network tools have their own advantages and functions, and their effects are different in different subject teaching. For the smart teaching of College English, the combination of Rain Classroom and Tencent Meeting can meet most of the teaching and learning function needs.

Since the outbreak of the epidemic in 2020, our college's online teaching has taken the Rain Classroom as the main teaching software, and the Rain Classroom + Tencent Meeting is adopted in 2022. The college has set up a WeChat group, and several staff members of Rain Classroom have been stationed in the group for a long time to answer the technical problems encountered by teachers in the teaching process, and often publish operation tutorials and excellent online courses of Rain Classroom for teachers to learn and observe.

2.2 Learning Situation Analysis

Due to the impact of the epidemic, online teaching of College English courses has been launched twice since 2020, which has promoted the reform of teaching mode based on Rain Classroom. By using Rain Classroom + Tencent Meeting platform, teachers found that the hybrid teaching model is more in line with the requirements of

College English teaching in this era, which is specifically reflected in the following aspects: 1) Contemporary college students have been exposed to electronic products since childhood, and their online life has almost become a part of their real life. The university stage is the age when they are most receptive to new things and can well adapt to the development of the smart environment. 2) The way for students to acquire knowledge from the Internet is becoming more and more convenient, and the traditional role of teachers in the classroom has been weakened. 3) College English courses in art colleges belong to public courses, which are taught in large classes and have less class hours per week. 4) In traditional classroom teaching, there are few requirements for students' learning before and after class. The extracurricular knowledge development is limited in each semester. Smart teaching can make English learning penetrate into students' extracurricular time, and maximize the efficiency of classroom learning.

Take the 12 classes of our 2021 college students of five majors as samples, relying on the smart environment, this paper designed a set of online and offline hybrid "synchronous" teaching mode suitable for them, mainly using Rain Classroom + Tencent Meeting. This paper will achieve the following three teaching effects for College English courses: 1) Monitoring students' pre class preview in a smart teaching environment. 2) Realizing online and offline synchronous teaching. 3) Making scientific evaluation and timely feedback on students' learning effects.

2.3 Teaching Design

2.3.1 Pre Class Teaching Design

Before class, the teacher will publish the preview requirements and materials to the students in the form of announcements or courseware in Rain Classroom. The teacher can view from the background page which students have read the announcements and which not, so as to give timely reminders. Teachers can also view the browsing duration of each person. The pre class interaction process between teachers and students is shown in Figure 3.
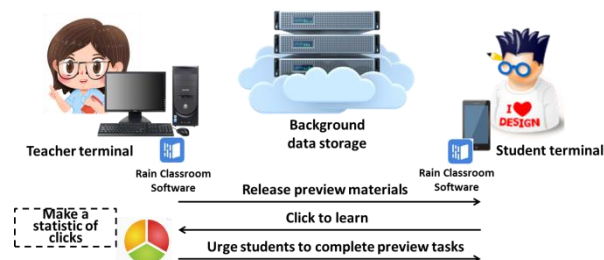

Figure 3: Pre class interaction between teachers and students based on Rain Classroom

2.3.2 Classroom Instruction Design

At the early stage of the COVID-19 epidemic, some students could not return to school and could only attend classes online; some have returned to school. The teaching software of "Rain Classroom + Tencent Meeting" is very suitable for solving the problem of online and offline synchronous teaching in this special period. Taking Rain Classroom as the core, we designed a new online / offline teaching process (as shown in Figure 4).
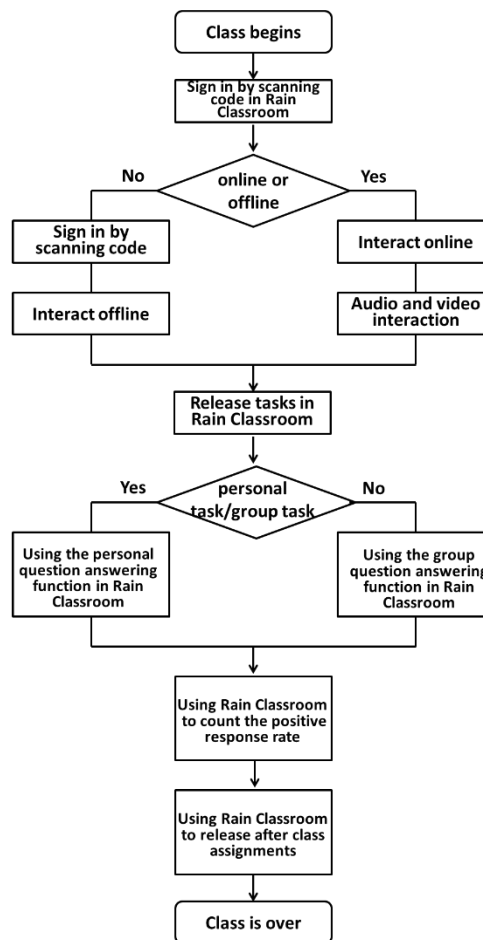

Figure 4: Online / offline teaching flow chart with Rain Classroom as the core

Before class, the teacher should open Rain Classroom first, send out the class notice, and let the online students sign in. Then the teacher clicks "classroom interaction" at the bottom of the "sign in" page, selects and clicks "Tencent Meeting" in the pull-up menu, enters the online classroom of Tencent Meeting, and then opens the "share screen" function, so that the students who study online can attend classes with their offline classmates. The content that online students see on their mobile phones or personal computers is completely consistent with the content that students in class see on the multimedia screen.

In the course of class, teachers can ask students questions at any time through the video or voice function

of Tencent Meeting, leave messages and interact at any time through the chat dialog box, or open the bullet chat function in Rain Classroom to let students ask questions. In the teaching process, teachers can release classroom exercises through the Rain Classroom for students to answer questions online, and timely correct and give feedback. Teachers can also link MOOC or other video addresses in the PowerPoint (PPT) courseware to expand knowledge and activate the atmosphere. Online learning students can even make English class reports and participate in group tasks through the Internet, completely free of space-time constraints. With the software of "Rain Classroom + Tencent Meeting", online and offline teaching methods can be synchronized. Because online and offline students are in different places but in the same class, they can participate in classroom learning activities and communicate with each other through the smart environment. The interaction process between teachers and students in class is shown in Figure 5.
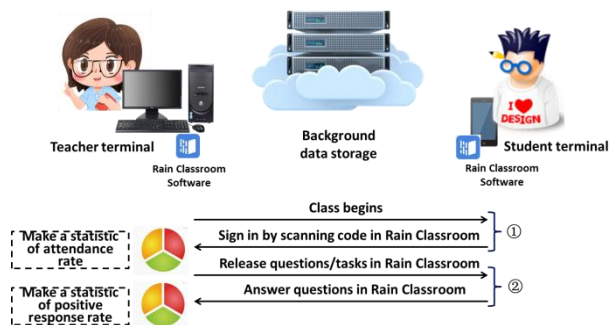

Figure 5: Interaction design between teachers and students in class based on Rain Classroom

2.3.3 After-Class Teaching Design

After class, the teacher can publish the PPT in Rain Classroom for students' review. Like the preview announcement before class, teachers can learn the detailed learning situation of each student, and students can put forward questions to teachers through the "learning feedback" function in the Rain Classroom. After-class assignments are all online. Teachers input exercise questions in batches in Rain Classroom, and students answer questions online. The software can provide teachers with complete student learning, which is very convenient. The interaction process between teachers and students after class is shown in Figure 6.
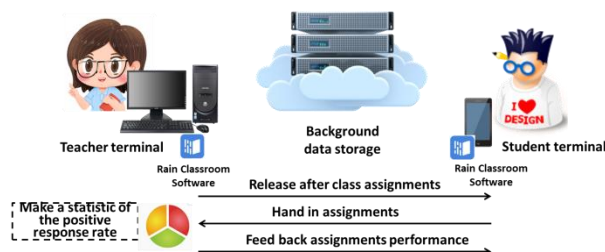

Figure 6: Design of teacher-student interaction after class based on Rain Classroom

3 ANALYSIS ON THE EFFECT OF TEACHING REFORM BASED ON RAIN CLASSROOM

3.1 Advantages of Rain Classroom

The biggest advantage of Rain Classroom is that it is easy for teachers to master and accumulate all kinds of data about students' learning. For example, teachers do not need to call the roll one by one for class attendance, and attendance statistics can be realized by signing in. The positive answer rate of students' assignments, the amount of reading of learning materials, the activity of students in class have been recorded in detail. The second advantage of the software is that it is bound to WeChat and Tencent Meeting. The mobile WeChat interface can be used as a remote control for teaching. The shared screen function of Tencent Meeting has also been made the best use. The third advantage is that the Rain Classroom itself is a teaching software embedded in PPT, which can link a large number of network resources, in line with the general direction of the development of smart teaching environment.

3.2 Limitations of Rain Classroom

The Rain Classroom itself has no voice or video functions, and it needs Tencent Meeting to realize audio and video connection. The data of students' learning situation is only a machine record, and the real effect cannot be verified. This may also be an insurmountable space-time problem in smart teaching. Teachers' workload is increasing because a lot of knowledge needs to be texted before it can be sent to students. The emotional communication between teachers and students is also disturbed because of the barrier of the network.

3.3 Strategies for Improving Teaching Effect under the Background of Smart Teaching

In the environment of smart teaching, Rain Classroom can provide learning data in pre class preview, online teaching, after-class assignments and other academic links, but the specific learning effect is difficult to reflect. If teachers rely on online teaching for a long time, the teaching effect is difficult to guarantee. If we want to improve the teaching effect, we may start from

cultivating students' credit. For example, students may "unlock" different levels of learning authority by means of "credit points promotion". This setting can promote students' initiative and self-consciousness in online learning.

4   CONCLUSIONS

At present, the smart teaching mode has brought the information revolution of the teaching method to the traditional classroom. This paper takes Rain Classroom + Tencent Meeting as the software platform to implement the smart teaching reform, puts forward the online / offline synchronization teaching mode of College English courses with the Rain Classroom software as the core, and evaluates the effect of the teaching reform. Future research will focus on the following aspects: 1) Strengthen the use of Rain Classroom tools to realize the collection and analysis of students' online and offline learning data. 2) Further combine the Rain Classroom tools with other teaching aids, select the optimal combination of teaching aids for different teaching scenarios, establish diversified links between teachers, students and learning content, and implement the monitoring and evaluation of the whole teaching process.

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