

Research on the application of "Rain Classroom" in teaching reform based on extensive data analysis

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Abstract: The big data technology is gradually applied to the field of education, and the development of the corresponding supporting teaching system has become the direction of new education reform, which has spawned various intelligent teaching platforms. "Rain Classroom" is a new teaching platform that combines online teaching technology and offline teaching resources and is a typical platform for building a hybrid teaching system. By revealing the problems in the traditional teaching mode, this paper discusses the principles and specific contents of the construction of the teaching system of "Rain Classroom" in the big data environment, proposes the system construction of the teaching reform based on "Rain Classroom" and the content of the curriculum construction, and finally analyzes the advantages and effects.

Keywords: Big data; "Rain Classroom"; Reform in education.

1. Introduction

With the rapid development of the information age and massive data generation, big data analysis technology came into being. In education, teaching data has become the most significant indicator of teaching improvement, and the role of big data in education has become increasingly prominent. China has continuously promoted the digital and intelligent education process in recent years. Based on traditional teaching, supporting the corresponding extensive data analysis technology, building a hybrid teaching system, and improving classroom efficiency has become new development direction to promote education reform.

2. Problems in traditional teaching mode

The traditional teaching mode takes teachers as the leading role, books, and classrooms as the communication tools and places, and students become one-way teaching objects. Under this model, students often lack the initiative and enthusiasm to learn and are in a one-way passive state of receiving classroom knowledge, which seriously restricts the improvement of the classroom teaching effect [1].

2.1. Student feedback lags behind

In the traditional teaching classroom, the interaction between students and teachers is limited to one-way questions at school or short communication after class. In most cases, to promote the progress of classroom teaching, students cannot give feedback to teachers on the mastery of a certain knowledge point in real time, and teachers cannot effectively collect relevant information to conduct research on students' learning [2].

2.2. Old teaching methods

In the traditional classroom, teachers still mostly use formal blackboard writing to interpret the teaching content [3]. The classroom atmosphere is relatively dull and lifeless. Without the help of modern teaching media, traditional explanations can easily make students lose interest in learning.

At the same time, the conventional test method is not convenient for statistics of learning performance data. For example, teachers need to manually calculate paper test papers for the wrong analysis of class students, which is easy to make mistakes and takes a long time [4].

3. Introduction to "Rain Classroom"

"Rain Classroom" is a teaching tool mainly for higher education. From the perspective of the software system, it is primarily divided into three parts: mobile phone, desktop computer, and remote server. Among them, the mobile phone end and desktop computer end directly serve the teaching of teachers and students, while the remote server is used to support the operation of the system and the collection, storage, analysis, and decision-making of teaching big data. The software interfaces of "Rain Classroom" are all based on PPT and WeChat, which better meet the needs of teachers. In the autumn of 2015, a survey of 126 college teachers in Beijing showed that PPT and WeChat were the two software that teachers were most familiar with on computer desktops and smartphones (PPT accounted for 61% of computer software and WeChat 93% of mobile software). To further reduce the threshold of use, "Rain Classroom," by enhancing the existing functions of the two software, has realized a series of positions [5], such as the extracurricular teachers can push video, voice, and courseware to students' mobile phones, and the classroom can conduct real-time communication and feedback between teachers and students. In this regard, it has dramatically reduced the learning costs of teachers and students and improved the ease of use of the software; On the other hand, it is also convenient for teachers to make full use of past courseware materials to carry out teaching [6]. As shown in Figure 1.

Follow Rain Classroom Official

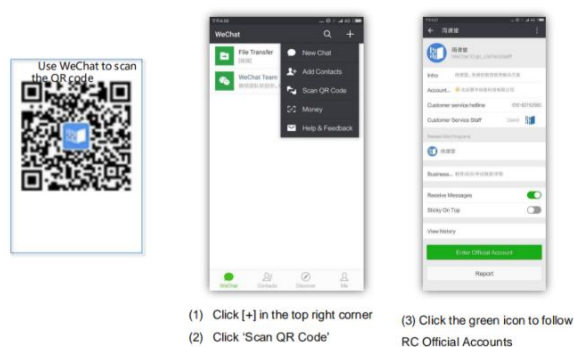


Fig. 1 Introduction to "Rain Classroom" WeChat official applet

3.1. The key points of "Rain Classroom."

The "Rain Classroom" can be likened to an intelligent teaching toolbox, from which teachers can choose and match the tools they are interested in to influence and promote their classroom teaching and realize the organic connection between "one lesson before the class and one lesson after the class." Specifically, the function of "Rain Classroom" involves the following three points:

3.1.1. Slide synchronization and "don't understand" feedback

During the course, if the teacher opens the "Rain Classroom" teaching mode, the software system will automatically generate a two-dimensional course code after the slide show, and the students can enter the class through WeChat scanning. In the class, every slide taught by the teacher will be sent to the student's mobile phone through the "Rain Classroom" so that the students can save the courseware and review the course content. The synchronization of the slides enables each student to listen to the class independently according to their learning rhythm, which better avoids the interruption of the students' listening ideas due to the teacher's change of slides.

3.1.2. Classroom exercise response system

Teachers can add questions in the PPT and conduct real-time classroom tests using the desktop computer plug-in of "Rain Classroom." At the same time, teachers can set the time limit for students to submit, and students can answer through the interface on mobile WeChat. In answering questions, teachers can know the details of students' answers at any time and give a "classroom red envelope" to students who respond quickly and satisfactorily. After the solution, the teacher can selectively disclose the distribution of the answer to the whole class so that students can know their position in the class. Currently, the types of questions supported by "Rain Classroom" include single-choice, multiple-choice, and voting questions, and its class exercise response system is popular with teachers and students.

3.1.3. Push of "Mobile Courseware."

By using the PPT plug-in on the "Rain Classroom" desktop computer, teachers can quickly convert an edited PPT file into a group of web pages with the same format as the PPT and push the courseware to the corresponding class students' WeChat through the operation of the mobile WeChat terminal. This courseware used for push is called "mobile courseware" in the "Rain Classroom" software. It can include network videos (including MOOC videos), exercises, votes, and teachers' voices. Using the making function of "mobile

courseware," teachers can create a rich micro lesson in a short time; After viewing, students can use the "Report to Teachers" function to feed back problems encountered in the learning process and suggestions to teachers. Based on the push features of mobile devices such as mobile Internet and smartphones, "Rain Classroom" can not only urge students to develop the habit of previewing but also provide teachers with many valuable student learning data. As shown in Figure 2.

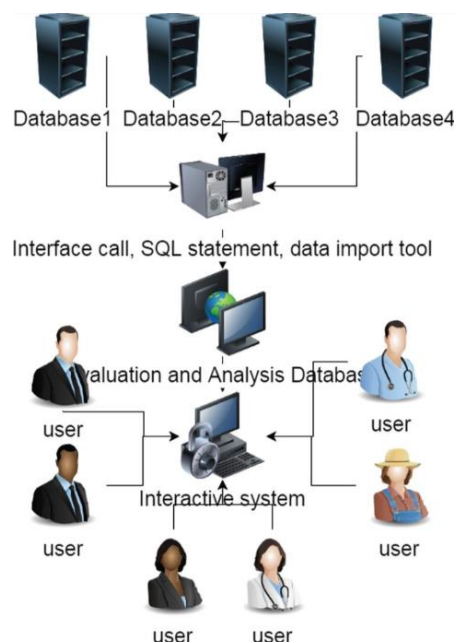


Fig. 2 Smart classroom precision teaching mode on English platform

4. Smart classroom precision teaching mode based on the "Rain Classroom" platform

As a product of the innovative teaching mode integrating advanced information technology and classroom teaching, the smart classroom is a new type of "student-centered." It uses the flipped classroom experience for reference, carries out efficient and diversified teaching activities, improves students' thinking ability and innovation abilities, promotes personalized and diversified development, and is committed to cultivating students' intelligence abilities. This research uses big data technology and the "Rain Classroom" platform to obtain the personalized characteristics and learning needs of students' learning behavior, dynamically adjust the teaching content and teaching methods, and build an innovative and efficient classroom for students in the integration of modern information technology and the classroom with the goal of students' intellectual development.

4.1. Accuracy of teaching objectives

Teaching objectives to play a guiding role in classroom teaching activities, determine the direction of teachers' teaching, and guide students' learning behavior. In the design of precise classroom teaching objectives, it is necessary to accurately describe the knowledge that students should master or the degree of skills they need to achieve in detail and carry out precise teaching according to the problems that students have in a specific knowledge point. That is to say, after the overall goal of the course is determined, it will be broken down layer by layer into many sub-goals that vary from student to student to achieve hierarchical teaching for

students so that each teaching goal can be accurate and quantified, and the teaching time is highly targeted, and students have a high degree of acceptance.

4.2. Personalization of the teaching process

Under the background of big data, the intelligent classroom precision teaching activities are reflected in the multiple interactions between teachers and students, with teachers as the leader and students as the main body. First of all, teachers search or make relevant learning materials (courseware, copywriting, audio and video, etc.), design test questions, and use the "Rain Classroom" platform to push them to students in time for preview before class according to the requirements of learning objectives and students' learning characteristics. At the same time, students can choose independent learning and testing, consult materials, communicate with classmates and teachers at any time to solve complex problems in the preview process, and cultivate enthusiasm for independent learning and finding and solving problems. Through the data information of the "Rain Classroom" learning platform (students' preview, analysis of test results, etc.), teachers can understand students' learning situation, including which resources students choose, the length and number of times to view the resources, the time spent in the test and the scores obtained, and what complex problems exist, and modify and optimize the teaching design scheme to specifically Make individualized teaching strategies for each student with an emphasis on the next step.

5. System construction of teaching reform based on "Rain Classroom."

Due to the particularity of some disciplines, it is difficult for some students to spend more time and energy studying professional introductory courses. They often rely on a small part of the time in class and after class or even the time for final review to study higher mathematics courses. Therefore, students often find it more challenging to learn higher mathematics, which puts higher requirements for teachers' classroom teaching and after-school guidance. This paper has selected some teaching classes among specific students to carry out the "Rain Classroom" teaching. Through the implementation of the whole teaching process and the students' survey and feedback, and in combination with the actual situation in 2020, this paper has made significant adjustments to the teaching content and methods among students.

In the setting of classroom problems, the teaching reform has been deleted, modified, and improved in different chapters. In this project, some relatively tricky questions will be removed from the class, and these questions will be left for thinking after class. Additional answers will be provided. Interested students can watch the video or come to discuss it with the teacher. The teacher also added some conceptual questions and tried to keep the consistency and coherence in each chapter so that the students could better understand the correlation and cause and effect between the questions. At the same time, the teachers in the classroom also found that students were more interested in the questions and answers to subjective questions. Every time they saw the solutions of different students in class, they would have a relatively warm discussion, which would help to activate the classroom atmosphere, and also enable students to more clearly understand the possibilities of different types of errors or

other ideas. Therefore, the teachers chose some content as subjective questions to strengthen students' understanding.

Students often find mathematics boring and have nothing to do with medicine. Therefore, at the beginning of the course, teachers introduce some popular research fields of the major to students and briefly explain the role of mathematics. In the teaching process, teachers will also choose some teaching contents to carry out the additional expansion to pave the way for the learning of subsequent courses and improve the students' interest in education. For example, when the teacher talked about linear algebra in the study, he gave examples to illustrate the relationship between matrix and image expression. He also improved the image quality by increasing the contrast of pictures to show matrix transformation and operation.

6. Curriculum construction based on "Rain Classroom" teaching reform

6.1. Preparation before "Rain Classroom."

Teachers design teaching offline. Students preview courses online. Teachers reconstruct the teaching content of each lesson according to whether the course content is suitable for flipping teaching, thoroughly plan the knowledge points to be taught, integrate the ideological and political elements, and relate to the frontiers of the disciplines involved. The "Rain Classroom" interactive system is used to strategically design classroom time-limited tests and classroom discussion links, including the number of tests, question types, sending nodes, and topics for discussion, so that classroom interaction can run through the teaching process, play a role in outlining the teaching content and making the finishing point, and feedback students' mastery of the curriculum objectives. On this basis, make full use of multimedia curriculum resources such as pictures, animations, videos, and engineering cases to make teaching courseware and preview courseware. For the course content suitable for flipped teaching, preview courseware should be combined with micro lessons, mini-lessons, and small tests to check the preview effect. Students complete the preview and test before class according to the preview requirements, preview courseware is pushed to the mobile terminal, and teachers check the students' preview feedback on the mobile terminal.

6.2. In the class process of "Rain Classroom."

Teachers and students online and offline interactive teaching, real-time feedback teachers open the teaching courseware, scan the WeChat code to log in and open the "Rain Classroom" teaching mode. Students review the WeChat code to sign in and enter the class. The teacher writes the QR code on the blackboard to facilitate the late students to join. The teacher knows the students' attendance according to the real-time statistical results of the system. The teacher starts teaching, and students receive the courseware synchronously on their mobile phones. During teaching, students can click "Don't understand" below the PPT at any time for anonymous feedback. Teachers send timed tests to help students deepen their understanding of essential knowledge points and send red envelope rewards to students who answer quickly and well to stimulate students' enthusiasm for learning. The teacher shall check the "don't understand" feedback and the time-limited test answer at any time, timely understand the mastery of the course objectives of all students, and dynamically adjust the teaching progress

and content. Teachers use bullet screen interaction, random roll calls, and other functions to organize classroom discussions, improve students' attention and participation, and activate the classroom atmosphere.

6.3. Summary after "Rain Classroom."

Teachers' offline evaluation and improvement, students' online review and improvement After each lecture, teachers receive the "Rain Classroom" course report, obtain the class attendance rate, student ranking, class time-limited test answer and accuracy, and students' "incomprehensible" feedback on the courseware content by checking the number of students, student data, exercise data, courseware data, etc., and know students' mastery of the course objectives in multiple dimensions, To explain and supplement in the following lecture and improve the teaching effect. Score and comment on the subjective questions published in this lecture, and send staged test questions for students to review and enhance after class. After all the course contents are completed, the data will be exported in batches, and the summary data, such as the total score of exercises, the rate of class arrival, the rate of courseware viewing, and the total number of interactions, will be viewed to provide a reference for the diversified evaluation of students' course scores.

7. Analysis of teaching advantages and effects of "Rain Classroom."

7.1. Giving the experience of intelligent teaching in a simple and easy-to-learn way

"Rain Classroom" is an intelligent teaching tool. Teachers only need a computer and a mobile phone, install a PPT plug-in of "Rain Classroom" to carry out "Rain Classroom" teaching, and students only need a mobile phone to learn. Through the intelligent terminal connecting teachers and students, each link before class, in class, and after class is given a new experience, and philosophical teaching in the age of big data is quickly realized.

7.2. Improving the efficiency of classroom management with fashionable and efficient technical means

The whole process of all students scanning the code to sign in only takes 1~2 minutes, compared with the traditional roll call, which takes 7~10 minutes, saving time. During teaching, teachers can also check the authenticity of code scanning sign-in by randomly calling names and viewing the in-class test list. After class, teachers can obtain detailed data such as the number of students entering the type, the time of signing in, the list of students, and the list of students who have not signed in. Taking the two teaching classes I taught as an example, after scanning the code to sign in, the average effective attendance rate reached 98% and 96.3%, respectively, and the variance was 0.020 and 0.018, respectively, which was significantly higher than the previous 70%~80% attendance rate of senior courses.

7.3. Provide support for accurate teaching with comprehensive and three-dimensional data analysis

The "Rain Classroom" will collect and analyze the teaching data in an entire cycle, including the number of submissions, the number of bullet screens, the feedback of

"incomprehension" and other classroom interaction information, the statistics of students' correct rate of answering questions in class and their scores, the statistics of homework completion and scores after class, and the preview content, duration and completion time before class. Teachers can quantify their learning based on these data, evaluate their usual performance, reflect on and summarize the teaching process, and help teachers teach accurately. At the end of the course, an anonymous survey was conducted on 106 students who received the "Rain Classroom" teaching. The statistical results show that 90.48% of the students agree with the "Rain Classroom" teaching model; 97.14% think that teaching "Rain Classroom" makes teaching more exciting and attractive. In addition, taking the course on principles of seismic design of engineering structures as an example, this paper analyzes the achievement of course objectives after teaching with "Rain Classroom" and compares it with the situation under the traditional teaching mode. The results show that after the "Rain Classroom" teaching reform, the achievement of all teaching objectives of the course has been improved to varying degrees.

8. Conclusion

The rapid development of big data technology has promoted the integration of big data and education and teaching and promoted the reform and innovation of intelligent classroom precision teaching mode. The smart classroom precision teaching mode under the background of big data is mainly based on data decision support to carry out teaching activities in all aspects to realize the online and offline multiple and three-dimensional interaction between teachers and students to complete the interaction between teachers and students, and to understand the student's mastery of knowledge and the adaptation of teaching methods through behavioral data. Using "Rain Classroom" in the data structure course has improved teacher-student interaction in real-time and efficiently. Traditional teacher teaching has changed into teacher-student communication and interaction, and the formal passive learning of students has transformed into students' active exploration and discovery. The teaching process of "Rain Classroom" allows teachers to understand students better and also will enable students to have the opportunity to communicate with teachers without burden. Teachers still need to work hard to create more and broader communication channels so that more students are willing to participate in the course learning.

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