

## The Mixed Teaching Design of Pathology Experimental Technology Course Based on “Boppps” Teaching Mode and “Rain Classroom”

Qiuting Wen, Xianyan Wang\*, Haiying Dong, Xiuwen Yu, Wei Dou, Zhongwei Ai

Department of Pathology, Qiqihar Medical University, Qiqihar, Heilongjiang, 161006, China

**Keywords:** “boppps” teaching mode, “rain classroom”, Experimental technology course of pathology, Mixed teaching

**Abstract:** Pathology is a bridge course connecting basic and clinical courses, and it is one of the main courses of medical education. It mainly studies the occurrence and development of diseases by observing the morphological changes of organs, tissues and cells, and is a basic subject with strong practicality. The mixed teaching mode based on “BOPPPS+Rain Classroom” is a new teaching mode that makes full use of modern information technology, which is of great significance to improve the teaching effectiveness of pathology experimental technology course. Make full use of the intelligent teaching tool “Rain Classroom”, and reform the traditional physical chemistry teaching in an all-round way through group teaching, experimental teaching and classroom interaction. Evaluate the course teaching through diversified assessment methods. Practice shows that the application of “BOPPPS+Rain Classroom” teaching mode has improved students' interest in learning and class participation, and enhanced students' willingness to learn actively.

### 1. Introduction

Experimental technology teaching plays a very important role in the overall teaching of basic medicine. The traditional pathological teaching design mode often takes the teacher as the main body and the student as the acceptor, and the whole hall adopts the indoctrination teaching, so the student is in a very passive position. In the instructional design mode, we should pay more attention to students' active learning, independent learning and personality development, and focus on educating and cultivating students' interest and participation in the learning process [1]. For nursing students in higher vocational colleges, learning is difficult, and the effect of traditional teaching methods is not ideal [2-3], so it is necessary to actively explore more effective teaching methods. Try to reform the traditional classroom teaching design and strengthen the conscious classroom interaction, so that students can really participate in the classroom, take the initiative to learn and improve the teaching effect.

### 2. “Boppps” Teaching Mode and “Rain Classroom”

#### 2.1 “Boppps” Teaching Mode

The “BOPPPS” (Bridge-Objective-Pre-assessment-Participation-Post-assessment-Summary) teaching mode is a modularized teaching method commonly used in European and American countries [4-5].

The “BOPPPS” teaching model divides the teaching process into six modules, which are in order: Bridge-in, Objective/Outcome, Pre-assessment, Participatory Learning, Post-assessment, and Summary. Teachers can design teaching content, assessment, and evaluation based on these six modules. Correct classroom teaching.

Under BOPPPS teaching mode, the classroom teaching process is divided into six stages, namely introduction, learning objectives, pre-class test, participatory learning, in-class evaluation and summary.

In the lead-in stage, the teacher briefly introduces the teaching content to achieve the goal of creating a good classroom atmosphere and stimulating students' interest in learning.

In the learning goal stage, the teacher introduces the teaching goal to the students.

In the pre-class test stage, teachers take various forms to test students' mastery of leading knowledge, and adjust the difficulty of teaching content in time according to the test results.

In the stage of participatory learning, teachers interact with students through classroom activities designed in advance, so that students can complete their learning tasks in the process of experience.

In the stage of in-class assessment, teachers use various testing methods to assess whether the teaching objectives have been achieved.

In the summing-up stage, teachers sort out the key points and difficulties of teaching and summarize effective thinking methods.

## 2.2 “Rain Classroom” Teaching Mode

“Rain Classroom” is a teaching mode with multi-dimensional interaction, ubiquitous perception, precise evaluation, data-based decision-making and personalized guidance, which is constructed by collecting and analyzing the data of teachers and students' teaching behaviors in an all-round and full-cycle way [6]. The learning platform based on the “Rain Classroom” intelligent teaching tool is shown in Figure 1.

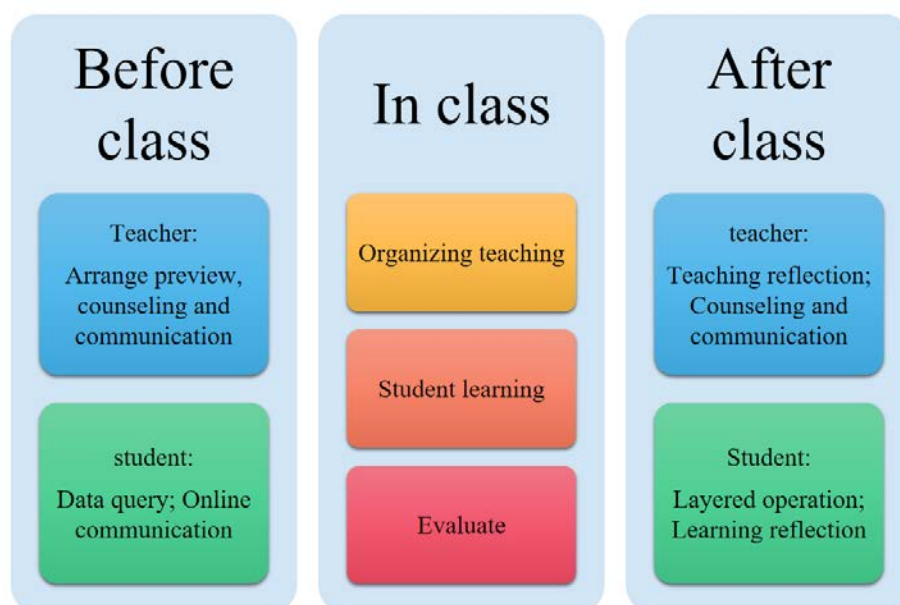


Fig.1 The Learning Platform Based on “Rain Classroom” Intelligent Teaching Tools

“Rain Classroom” integrates modern information technology into PowerPoint and WeChat by sending courseware, announcement, check-in, barrage, exercises, red envelopes, submission, random roll call, discussion, “don't understand”. Build a bridge that runs through the new teaching functions and modes of “before class-during class-after class”, endow the classroom with a brand-new experience, release the energy of teaching and learning to the greatest extent, and enhance the teaching effect.

Establishing a communication bridge between the extracurricular preview and classroom teaching can stimulate students' learning enthusiasm and release the energy of “teaching and learning”. Before class, you can preview, read materials and answer questions interactively: once you enter the system to sign in for study in class, your mobile phone will be locked into a learning state. You can read courseware, interact with barrage and take notes according to the progress of classroom teaching.

After class. Teachers can reflect on classroom teaching through background data, and arrange homework and tests at different levels according to different students, so as to realize: students can learn their own textbook “conceptual knowledge” after class and online without teaching; students can easily acquire knowledge without teaching; students can achieve higher efficiency and better results without teaching beyond their existing cognitive level.

### **3. Path of Constructing Hybrid Teaching Mode of Pathology Experimental Technology Course Based on “Boppps+Rain Classroom”**

As with other disciplines, the course of pathology technology has its inherent interrelation, as well as complicated variability and non-simulation. Therefore, to correctly predict and analyze the ever-changing pathological changes, it is necessary to make objective and accurate judgments on various pathological changes under the guidance of basic theories [6]. Therefore, how to guide students to use theory to guide experiments, and then use experiments to verify theories, so as to strengthen theoretical knowledge, has become one of the important contents of pathological experiment teaching.

Experiments can not only verify the theoretical knowledge learned in class, deepen and consolidate students' understanding and memory of theoretical knowledge, but also cultivate students' ability to observe and analyze problems.

The basic system of the course of experimental technology of pathology consists of two parts, namely, general and various theories. General theory is the basis of the course of pathology experimental technology, which mainly discusses the common basic pathological changes in the process of diseases, while each theory is the specific pathological characteristics of various diseases. Both of them explain the occurrence and development laws of diseases from the point of view of commonness and individuality of diseases [7].

Thrombosis formed on the surface of atherosclerotic plaque, rheumatic or infective endocarditis and local endocardium of myocardial infarction in various diseases of cardiovascular system are concrete manifestations of cardiovascular intimal injury in various diseases. Therefore, the content of the general theory is abstract and difficult for students to understand, so it is necessary to properly combine the specific diseases in each theory to strengthen understanding and memory.

The experimental technology course of pathology is based on the mixed teaching mode of “BOPPPS+Rain Classroom”, which is an active exploration under the advocacy of the concept of “Internet+Education”. It fully combines the respective advantages of BOPPs and “Rain Classroom”, and strives to improve the teaching quality of the experimental technology course of pathology [8].

The construction path of the hybrid teaching mode based on “BOPPPS+Rain Classroom” for the course of pathology technology is shown in Figure 2.

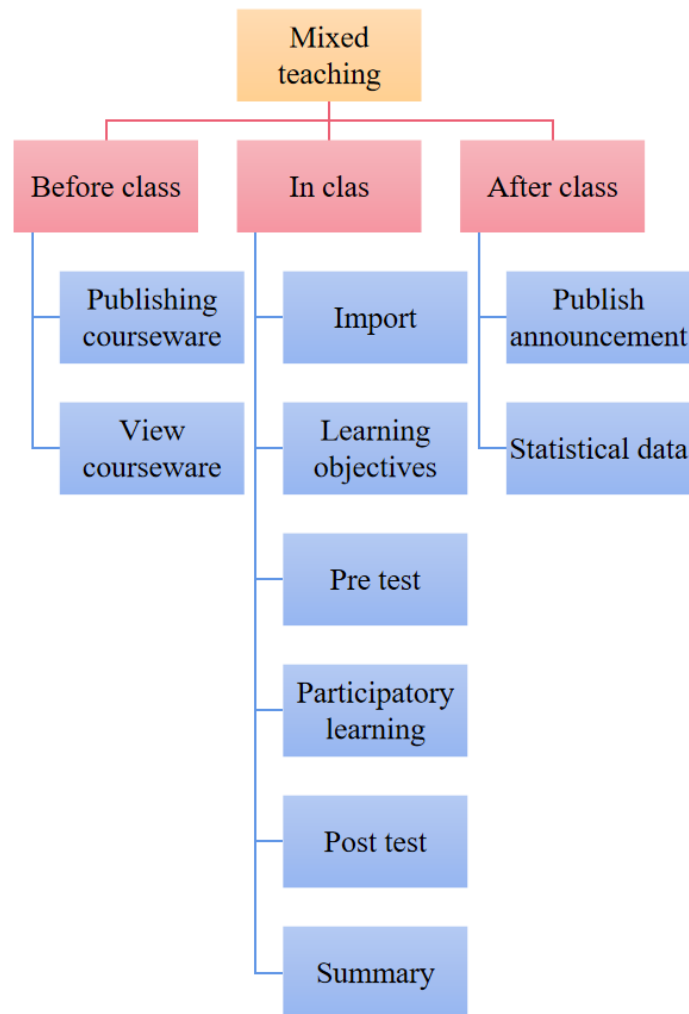


Fig.2 The Mixed Teaching Mode of Pathology Experimental Technology Course Based on “Boppps+Rain Classroom”

The mixed teaching mode of pathology experimental technology course based on “BOPPPS+Rain Classroom” divides the teaching process into three parts before class, during class and after class, and all the parts are connected with each other to form a vivid and profound pathology experimental technology course.

Before class, teachers use “Rain Classroom” to publish courseware for students to preview and self-test. Students complete preparatory work such as preview or self-test according to teachers' requirements. Then, teachers refer to the results to understand students' specific autonomous learning situation.

According to “BOPPPS” teaching mode, the class is divided into six parts: introduction, objective learning, pre-test, participatory learning, post-test and summary, and these six parts are vividly displayed in combination with the function of “Rain Classroom” to improve the vividness of pathology experimental technology course.

In the lead-in part, teachers can improve students' attention by means of “Rain Classroom” announcement, sending courseware and signing in, which leads to the theme of this lecture. Learning objectives can be pushed to students by means of announcement or sending courseware, so that students can make clear the objectives of this course from the beginning.

In participatory learning, students can participate in the classroom by means of discussion, barrage, random roll call, and submission of contributions, so as to enliven the classroom atmosphere in the interaction with teachers and deepen their understanding and mastery of knowledge points. In the post-test part, teachers can know the effect of students' classroom learning through the functions of random roll call, voting, exercises, submission and grabbing red packets.

After class, teachers make use of “Rain Classroom” to publish announcements, instruct students

to review the class contents in time, review the past and learn new things, and use the feedback data of “Rain Classroom” to assist in analyzing the teaching situation of this class, so as to carry out targeted teaching in the next class.

#### 4. Practical Effect of Hybrid Teaching in Experimental Technology Course of Pathology

##### 4.1 Statistical Analysis

After-class testing and mind map evaluation, more than 90% of the students in the experimental group agreed with the teaching mode, and more than 85% of the students thought that the teaching mode was more systematic and expanded in thinking ability (see Figure 3).

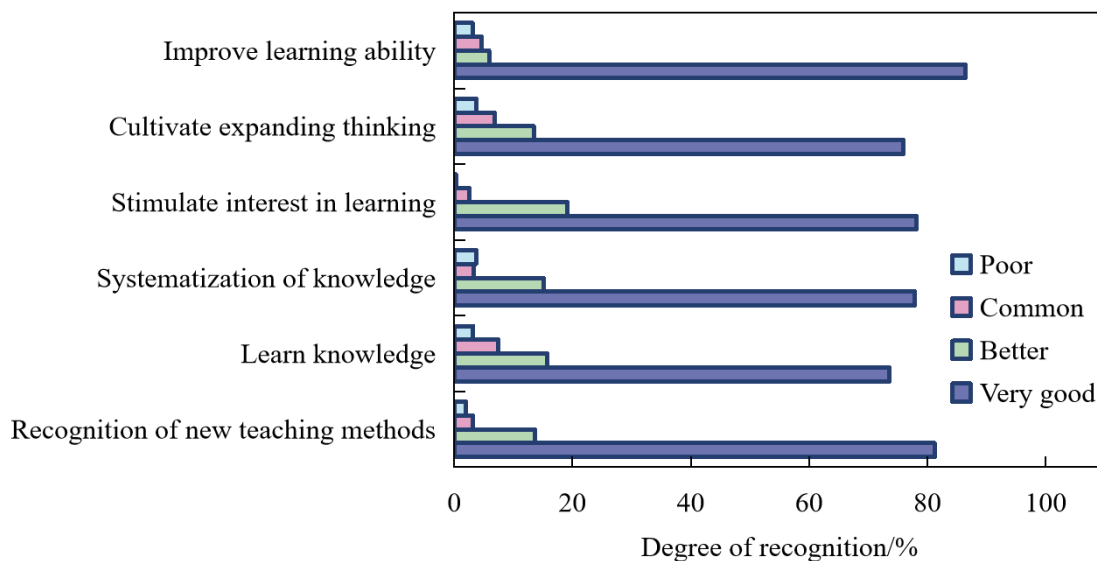


Fig.3 Questionnaire Survey Statistics of Experimental Students

The teaching mode of “BOPPPS+Rain Classroom” modularizes the teaching process, and constructs six elements, such as introduction, teaching objectives, probing, participatory interactive teaching, inspection, evaluation and summary, which provides teachers with a complete framework and theoretical support covering all aspects of classroom teaching. The teaching mode has strong practicality and operability, thus making the arrangement of classroom teaching more rational and organized.

Students will provide teachers with a great deal of information. Through the feedback from teachers and students, teachers can find out the problems in teaching and students' requirements for teaching and suggestions for improvement in time, and check for gaps and fill in gaps, so that teachers can carry out teaching reform in a targeted manner to improve the teaching level of the whole major in an all-round way.

The mixed teaching practice of pathology experimental technology course based on “BOPPPS+Rain Classroom” has improved the interaction and communication efficiency between teachers and students, and effectively improved the teaching efficiency and teaching quality. Teachers can instantly and dynamically understand students' learning situation, and provide targeted teaching according to students' grasp of knowledge points. Students can discover their own knowledge loopholes in time, study in a targeted way, improve learning efficiency, and increase their cooperative awareness and autonomous learning ability through group discussion and explanation.

##### 4.2 Suggestion

Any course teaching should be carried out according to the specific situation of the students in the teaching class, and individualized teaching can be carried out according to the gender, source of students, majors and even different students' personalities. In addition, due to the limitation of class hours or other aspects, in the process of carrying out the mixed teaching of “BOPPPS+Rain

Classroom”, the teaching scheme should be adjusted in time according to the changing reality, instead of sticking to the fixed teaching mode.

In the practice process of this teaching mode, it is necessary to carry out targeted teaching process design and adopt various teaching methods to realize participatory interaction between teachers and students, so as to better ensure the achievement of curriculum objectives. Therefore, according to the concept of “BOPPPS+Rain Classroom” teaching mode, in the process of higher education teaching reform, we should strengthen the student-centered teaching concept, strengthen the construction of teacher training departments and strengthen the construction of evaluation system.

The six sections of “BOPPPS” (introduction, learning objectives, pre-test, participatory learning, post-test, and summary) do not have to be carried out in the prescribed order, nor do they need to cover all aspects; Similarly, the three parts of “Rain Classroom” (before class, during class and after class) are not fixed.

In a word, teachers of pathology experimental technology course should combine the course with the specific class situation and carry out teaching activities according to local conditions.

## 5. Conclusion

To sum up, in the process of pathological experiment teaching, on the one hand, we can give full play to the role of experimental class, cooperate with theoretical teaching, enrich teaching content, improve teaching efficiency and strengthen teaching effect; On the other hand, it can further consolidate students' basic concepts, basic theories and basic skills, and lay a solid foundation for the study of clinical courses in the future. “BOPPPS+Rain Classroom” can accumulate every data of the activities of teachers and students in the learning process, and form big data of teaching work. These data provide a reference for teachers to grade students' grades at the end of the term, and can also be used as the basis for process assessment. It is necessary to realize that the mixed teaching mode of “BOPPPS+Rain Classroom” is only an idea and a framework in itself, and its purpose is to effectively improve the teaching effect through the organic decomposition of the teaching process. The implementation and development of “BOPPPS” teaching mode has important reference value for the teaching reform of higher education.

## 6. Acknowledgment

The 2020 Key Project of the 13th Five-Year Plan of Education Science in Heilongjiang Province (Project No.: GJB1320398); Topic: BOPPPS teaching mode combined with TBL teaching method and integrated into “Rain Classroom” to create a “golden course” of experimental technology in pathology experimental technology course.

## References

- [1] Yanqin Chen. Application of Blended Teaching Mode to College English Class Based on MOOC and “Rain Classroom”. *Vocational Education*, vol. 08, no. 3, pp. 123-127, 2019.
- [2] Tujing. Analysis of Learning Behavior in Intelligent Classroom Teaching Based on “Rain Classroom”: the Course of Principles and Applications of Database as an Example. *Journal of Hefei University* , no. Natural Science Edition), vol. 036, no. 002, pp. 63-67, 2019.
- [3] Sun H . A SPOC Teaching Mode of College English Translation Based on “Rain Classroom”. *International Journal of Emerging Technologies in Learning (iJET)*, vol. 14, no. 17, pp. 182, 2019.
- [4] Huang S, Yang J, Lu C, et al. Application of a Three-Segment E-learning Mode in Diagnostics Course Based on “Rain Classroom”. *International Research in Higher Education*, vol. 5, no. 2, pp. 16, 2020.
- [5] Sun Yurong, Wang Xianyan, Han Lijun, et al. Thoughts on the teaching design of pathology

courses based on BOPPPS teaching mode. *China Higher Medical Education* 2020, no. 3, pp. 79-80, 2020.

[6] Du Xiangyu, Li Dexin, Chen Changlin. Research and practice of online and offline hybrid teaching of analog electronic technology based on BOPPPS model. no. 2020-13, pp. 8-12, 2021.

[7] Zhang Yongchun, Li Yan, Zhu Yaling, et al. Exploration and practice of blended teaching of drug analysis courses based on BOPPPS model. *Education Modernization*, vol. 6, no. 87, pp. 307-308, 2019.

[8] Zhang Weihua, Wang Haiying. Research on online and offline hybrid teaching mode based on BOPPPS model. *Computer Knowledge and Technology: Academic Edition*, vol. 16, no. 5, pp. 3, 2020.