The Application of the BOPPPS Mode in the Teaching of Knitting Technology Under the Mart Classroom Environment

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Abstract. The construction and using smart classroom focuses on creating an interactive teaching environment for students, while BOPPPS teaching mode is a student-centered teaching mode. On the basis of expounding the meaning of the BOPPPS mode, this paper focuses on continuing to improve the teaching and learning methods by combining the BOPPPS teaching mode in the smart classroom environment, so as to stimulate students' learning initiative and improve students' innovative thinking and ability. "Knitting technology", as a core course of the textile engineering major, is taught in accordance with the structural characteristics of knitted products and in combination with the BOPPPS mode in the smart classroom environment to clarify the basic theory of the development and production of knitted products and the basic knowledge of process design. Compared with the traditional teaching method, the smart classroom and BOPPPS mode in knitting teaching can not only guide students to master the basic professional knowledge, but also cultivate students' ability to find, analyze, design, and solve problems, cultivate fabric designers with the basic knowledge system of knitting product development and the ability to solve practical engineering problems, and improve the core competitiveness of the talents in the knitting industry.

Keywords: smart classroom · BOPPPS teaching mode · knitting technology · instructional design

1 Introduction

Nowadays, the intelligent teaching method brought about by the rapid development of information technology has become the consensus of people. How to effectively use the smart classroom to improve their teaching ability and students' understanding ability is a problem worth thinking about. At present, the model of integrated teaching has become a normalized education model [1]. The BOPPPS teaching model, based on constructivism and communicative approach, is a closed loop teaching process model that emphasizes students' participation and feedback, and is a teaching model that many famous schools in North America prefer [2]. This model implements the teaching concept of "learning by teaching, doing by learning, and correcting by doing". It is goal-oriented, highlights students' active participation in learning, modularizes and decomposes the teaching

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process, and advances layer by layer. It allows students to participate in and discuss in class in a great deal, highlights the learning effect and timely detection and evaluation [3]. As a core course of the textile engineering major in colleges and universities, the teaching of knitting is based on the basic theory and professional knowledge of the textile specialty to enable students to master the basic theory and professional knowledge of the knitting specialty, and cultivate students' ability in comprehensive engineering, application of advanced technology, product development and innovation [4]. However, at present, the teaching of knitting is still taught by traditional ways, which are teacher-centered, and teachers always resort to blackboard writing and PPT teaching tools, and implement the "duck feeding" teaching mode, which lacks interaction, and is not conducive to developing students' learning interest and learning ability [5]. Through the effective combination of the BOPPPS teaching mode and the smart classroom, this paper is not trapped in the traditional knitting teaching, and carries out the systematic design of teaching according to the characteristics of the textile knitting course. By using the smart classroom, it combines the theoretical knowledge of knitting product design with practice in the classroom to improve the teaching effect, so that students can improve their ability to independently discover, analyze, design, and solve problems while mastering the basic professional knowledge. By this way, it can also train students to have the basic knowledge of developing knitting products and the ability to solve practical engineering problems, so as to cultivate high-level talents.

2 Effective Combination of BOPPPS Teaching Mode and Smart Classroom

2.1 Concept of BOPPPS Teaching Mode

The BOPPPS teaching mode originated from the teacher skills training in Canada. It is a teaching model featured by teaching objectives oriented and student-centered [6]. It designs the whole teaching process into six stages of "introduction, goal, pre-test, interaction, post-test, and summary". It starts with attracting students' interest in learning. Before teaching, the teacher informs the teaching goal to achieve goal orientation, and carries out a pre-teaching test for students so that the teacher can understand their knowledge and ability reserves, and then the teacher designs interactive participatory teaching activities based on the test results. After the teaching activity is completed, the teacher understands and masters the students' learning situation from the post-test, and finally carries out the teaching summary. This summary will be the next introduction [7].

2.2 Advantages of Using BOPPPS Teaching Mode in Smart Classroom Environment

In the smart classroom, students are the main body. It makes full use of information technology and intelligent technology to improves the teaching content, and makes it easy for students to master knowledge. Through a variety of teaching forms such as mixed teaching, flipped classroom, cooperative learning, inquiry learning, etc., the classroom

teaching atmosphere is activated, students' learning enthusiasm is stimulated, and classroom teaching efficiency is improved [8]. The classroom under the smart classroom environment has intelligent equipment support, intelligent teaching system, and intelligent teaching services. The smart classroom teaching based on the BOPPPS model has its unique advantages [9]. By using the pretest function of intelligent analysis in smart classroom, the teacher can group students [10]. At the same time, the teacher can also make process evaluation of students' progress in class by comparing the data of pre-test and post-test, so as to achieve the best teaching effect by changing teaching methods. Through the analysis of the smart classroom, the teacher can understand each student and achieve the goal of teaching students according to their aptitude. The ultimate goal of the smart classroom is to help teachers teach and educate people better. Thus, its smart service should not only stay in the classroom, but also be applied to the whole process of learning before, during and after class. When teachers cannot take care of students with learning needs at the same time, the intelligent question answering system can give students some help and suggestions in time, and improve the teaching quality through human-computer cooperation. Finally, the application of multi-screen sharing, real-time screen and other functions provides intelligent and humanized interactive learning space for teaching, helps teachers and students to communicate and share at any time, and facilitates in-depth interactive teaching [11].

3 Instructional Design for Knitting Science with the Use of BOPPPS Teaching Mode in Smart Classroom Environment

3.1 Teaching Design of Knitting Course

The difficulty of knitting is how to translate the theoretical concept of knitting into practical application, so that students can practice based on theory, and experience the fun of learning from the relatively lengthy theoretical concept learning process, and improve their theoretical basis. In the environment of smart classroom, combined with the BOPPPS mode, the teaching design of knitting is constructed, and the complicated teaching process of traditional teaching is abandoned. The manual function is used to simplify the complicated theoretical knowledge of knitting, such as knitting process design, triangle configuration principle, coil shape, loop forming method process, coil series sleeve method and so on. At the same time, it can use artificial intelligence, big data and other information technologies to help students through the theoretical teaching and learning process, and integrate practice into the theoretical learning process through the intelligent system in the theoretical learning process. At the same time, it can help teachers carry out efficient, scientific and objective teaching evaluation and management with the support of intelligent evaluation, and solve the traditional teaching problems in the BOPPPS model, which are complicated between the pre-test and post-test in class.

The key to carrying out efficient knitting teaching in smart classrooms is to carefully design practical and applicable teaching programs, while the six-stage loopback of BOPPPS mode can effectively guarantee the effectiveness of teaching. At the same time, the various support provided by the smart classroom can effectively play the advantages of the BOPPPS model. Therefore, based on the three processes of "before class, during

class and after class" in the smart classroom, the knitting teaching design under the smart classroom environment and based on the BOPPPS model is constructed.

3.1.1 Before Class

The teacher needs to focus on the knitting knowledge points to be taught, such as the theoretical and conceptual knowledge including the production process of warp knitting, the characteristics and formation of the structure of warp knitted fabrics with warp knitting coils, the production process of warp knitting, the representation method of warp knitted fabrics (using coil diagram, pad yarn motion diagram, threading pair yarn diagram, and pad yarn digital and artistic drawing), the classification of warp knitting machines, the organization structure and knitting process of common warp knitted fabrics, as well as the application of warp knitted products and the classification of warp knitting machines, all of which require a deep and systematic understanding in advance; the teacher need prepare and design corresponding pre-learning resources and guidance plans carefully; And the teacher should interpret the lengthy conceptual knowledge in a way that is easier for students to understand. It is helpful for students to have a preliminary understanding and understanding of the pre-class content, as the first knowledge internalization of students, and provide data analysis and pre-judgment for subsequent in-class teaching, and carry out effective, targeted and beneficial knitting teaching activities after in-depth understanding of students' situation.

3.1.2 In Class

According to the BOPPPS model and based on the analysis and statistics of the students' learning situation before class, the knitting teaching situation that can not only meet the students' physical and mental development, but also successfully introduce the teaching content is set up. In the pre-test, simple multiple-choice questions, judgment questions and emotional attitude analysis questions can be used to judge the students' original ability and learning attitude to the knowledge of coil forming form, loop forming method, organizational structure composition in the knitting course, and students can be grouped according to the data analysis of the intelligent system to prepare for the subsequent effective group practice and cooperative exploration. In the process of participatory learning, first of all, teachers need to ask students' opinions, make flexible adjustments to the grouping of groups and classes, create a democratic and pleasant learning atmosphere, so that students can speak freely in the interactive discussion; Secondly, when group members conduct inquiry learning, teachers should be good at using the intelligent auxiliary system of smart classroom to carry out classroom teaching, so as to promote the in-depth interaction between teachers and students, students and students in the classroom. In the post-test phase, in addition to the personalized post-test exercises that can be automatically recommended to students by the system, teachers should also organize students to display and share the learning results of each group, and create opportunities for students to share learning ideas and creativity, so as to improve students' construction and practical operation ability of knitting theory knowledge. In the summary section, teachers can use visual learning tools such as mind map, especially for some knowledge points that is abstract and difficult to understand, allow students to

independently recall and construct the knowledge of the looping mechanism and operation principle of the warp knitting machine, the looping mechanism and looping process of different knitting machines (slot needle warp knitting machine, tongue needle warp knitting machine and hook needle warp knitting machine), and also sort out the content learned in this lesson. Thus, the teacher can further deepen students' mastery and internalization of knowledge, and also help improve students' information literacy and digital learning ability. In addition, when conducting teacher evaluation, mutual evaluation and self-evaluation, teachers need to guide students to use more positive words, give students comprehensive evaluation in the form of positive reinforcement, emphasize student-centered, consider the development and progress of all students, and pay attention to the process evaluation of students.

3.1.3 After Class

Teachers should carefully analyze the data report of students' classroom learning on the intelligent teaching platform, effectively understand the progress of students' knowledge, ability, thinking and other aspects in classroom learning, and use the intelligent evaluation system to arrange personalized after-school assignments for students in layers according to the overall performance of students in the learning process, and guide students to internalize the knowledge of the pre-class such as coil shape, loop forming method, organizational structure and other aspects again after class to maintain students' interest and motivation in learning knitting knowledge.

3.2 Precautions

3.2.1 Analysis of Teaching Situation

The teacher should distinguish between the selection of participatory teaching mode for smart classroom and the setting of interactive links. For example, some teachers pay attention to open questions to cultivate divergent thinking, and some teachers pay attention to process analysis and discussion and teachers' timely summary. Secondly, each student's knowledge base, cognitive level, learning ability and personality characteristics are different, so grouping should be reasonably allocated based on the teaching needs, because effective grouping is the primary premise of cooperative discussion in participatory learning. The teaching method of the smart classroom should not be too simple. It should be properly matched with the smart classroom and the traditional classroom according to the specific learning situation, so as to enable students to digest the complicated theoretical knowledge of knitting with higher efficiency, and thus improve students' practical operation ability of knitting equipment, and promote students to acquire high-level cognition.

3.2.2 Adjustment of BOPPPS Mode

The BOPPPS mode is essentially a reference for teaching process design, and is not a fixed model. It should be adjusted according to the actual learning situation and teaching content [12]. According to the teaching objectives, a highly interactive and mixed

BOPPPS teaching mode with in-depth integration of information teaching and three-dimensional teaching methods can fully realize three-dimensional communication and interaction, accurate teaching objectives, real-time evaluation and feedback, and intelligent resource recommendation. It not only increases the challenge of the curriculum, but also improves the feature of innovation and high-level in the curriculum [13, 14]. The design of a teaching segment can also nest multiple BOPPPS teaching modules according to the specific content. For example, in the teaching of the knitting principle of flat knitting machine, the teacher should introduce the principle, set goals, test before class, teach, test after class and summarize by taking the principle as a large category, and then the knitting mechanism, looping mechanism and other knowledge points will be split to set small goals for nested teaching, so as to achieve better teaching effect. The BOPPPS model should be designed according to the actual needs to achieve the best teaching effect [15]. This systematic, organized and rational design of BOPPPS teaching mode makes the teaching content more concise and the theme more concentrated.

4 Conclusion

Smart classroom is the inevitable trend of the development of classroom form in the new era. Its ultimate goal is to give full play to the role of smart classroom, promote the reform of classroom teaching structure, and improve the teaching effect. Mixed teaching has become the "new normal" of college teaching, and the key factor for its successful development is innovative teaching design. The BOPPPS model emphasizes the student-centered teaching concept, and pays attention to the interactive participatory learning between teachers and students. Based on the effective combination of the smart classroom and the BOPPPS model, this paper constructs the knitting teaching design process based on the BOPPPS model in the smart classroom environment, and makes use of the characteristics of the smart classroom that can help students before class, in class and after class; based on the key content of the knitting teaching, it puts forward specific implementation suggestions, so as to make the organization and arrangement of the classroom teaching activities more reasonable and organized. When carrying out practical teaching, teachers should adjust and use the BOPPPS mode according to the teaching object, teaching environment and other factors, design practical and efficient classroom teaching activities of knitting, and improve students' knowledge absorption in class and independent learning ability after class.

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