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Study on the Application of the Combination of Students' Micro-video Recording and Reversal Classroom in the Teaching of Endodontics

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Abstract: Dental endodontics teaching requires a high level of combination of theory and practice, and the traditional teaching model alone cannot achieve the goal of enhancing students' autonomous learning ability and clinical practice ability. Conforming to the background of the rapid development of the Internet, this study selected two classes of 2018 5-year stomatology from North China University of Science and Technology as the research objects, and used the combination of student micro-video recording and reversal classrooms to explore the dental body that conforms to the OBE concept. A new model of endodontics teaching, it is expected to provide new ideas for the relevant course professors who need to combine theory with practice.

Keywords: OBE; Dental Endodontics; Internet; Teaching Methods; Teaching Effect.

1. Introduction

Endodontics is an important clinical course in stomatology, which has high requirements for the close combination of theory and practice. In stomatology, the proficiency of its operational skills and the clarity of diagnostic logic are particularly important. How to improve students' ability to combine learning and application is a key topic for stomatology teachers to test [1]. Although the major medical colleges and universities in China are equipped with instruments and equipment such as imitation head moulds and comprehensive dental treatment chairs, and have the conditions to simulate the real clinical situation in experimental teaching, however, the traditional teaching and demonstration methods are still used in teaching activities, which makes it impossible to ensure that every student can see the details of the teacher's operation, and the teacher is unable to observe the students' operation comprehensively. So that students cannot fully mobilize their enthusiasm and enthusiasm for learning, nor can they get timely and comprehensive teaching feedback.

In recent years, OBE teaching concept has been applied to the teaching reform of colleges and universities, which emphasizes that students are student-centered and pay attention to whether students have really obtained the abilities and learning achievements they should have. Flipped classroom refers to the combination of modern teaching methods, make full use of large-scale open network teaching resources, re-adjust the time inside and outside the classroom, and transform the traditional "teacher-centered" into a "student-centered" hybrid teaching model [2]. In order to comply with the development of the times and ensure the teaching quality, we explore a new teaching mode of diversified teaching with students as the main body, and apply students' micro-video recording and reversal classroom to the teaching of dental pulp theory and experimental courses. finally, it is compared with the traditional teaching model, and the differences in students' assessment scores and learning effects under the two modes are analyzed. The purpose of this study is to provide reference for exploring a new teaching model which is more suitable for contemporary higher medical education.

2. Research Methods

(1) Grouping teaching contents and teaching objects

Traditional embroidery comes from ancient Chinese culture, so it will be very colorful. Pattern content is more all-encompassing. Typical patterns include dragon pattern, cloud pattern, landscape, flowers and birds, etc. These ancient patterns are not only beautiful in appearance, but also sustain people's feelings. Traditional patterns often have stronger decorative effects and strong artistic viewing power. In the development process of embroidery, the traditional art of our country, we should also have some very characteristic narrative patterns. These patterns are through the combination of patterns, patterns and patterns are interrelated, telling a complete story, so there is obvious coherence between patterns, paving the way for the development of the whole story.

The teaching contents included in this study are "Dental Pulp Diseases" (People's Health Publishing House, fourth edition): chapter IV treatment of dental caries, Chapter V silver amalgam filling, Chapter VI bonding repair of dental defects, Chapter 19 Root Canal Therapy, Chapter 20 Applied Anatomy and Pulp opening, Chapter 21 Root Canal preparation and Disinfection, Chapter 22 Root Canal filling.

Teaching objects: undergraduate students majoring in Stomatology of Grade 2016 were selected as the object of study. Class 1 was the reform group (68 students) and Class 2 was the traditional group (70 students). The teaching teachers and class hours of the two groups were the same, and there was no significant difference in school achievement, age, gender and other general data ($P > 0.05$).

(2) Teaching steps and implementation methods

I Reform group

i Pre-class preparation: 1) The instructor records the lecture video and courseware, which are posted on the Superstar Learning Link teaching platform before the start of the class. 2) Organize students to explain and train their learning methods. 3) According to the teaching progress, teachers post

tasks on the teaching platform before class, students watch and learn independently, divide into groups with dormitories as units, and appoint a group leader to assist teachers in supervising the completion of pre-class tasks and improve learning efficiency. 4) Students' learning questions are fed back through the learning discussion area, and questions are answered online by teachers and teaching assistants.

ii Laboratory teaching stage: 1) Students discuss pre-class video learning, including learning content, lessons learned and existing problems. 2) Teachers explain the difficulties and key parts, students practice with front-line learning and classroom re-learning, teachers visit the class to answer students' questions and guide students to encounter problems in operation. 3) Students record a micro-video and are asked to explain it while operating. 4) Mutual evaluation was conducted in the group, and one excellent video was selected for each group.

iii Theory teaching stage: 1) The class plays the excellent video selected by each group, students' questions, teachers' questions and group defense. 2) The teacher makes comments and summarizes the video and online problems, the key and difficult points in learning and the various problems encountered by students in their learning.

II Traditional group

Using the traditional teaching method, the teacher first teaches the theoretical course, carries on the operation demonstration in the experimental class, then the students practice, the teacher inspects and guides the students, the class assigns the homework, and the teacher corrects after class. The teaching reform chapter of this course is taught by the same teacher.

III Observation index

i The questionnaire survey of the teaching effect of the two groups of students' attitudes towards the teaching effect is based on the following aspects: 1) Do you like the way of teaching? 2) Can you stimulate interest in learning? 3) Is it beneficial to practical operation? 4) Is it conducive to the mastery of theoretical knowledge? 5) Whether to improve the ability of collaboration? 6) Whether it is beneficial to the exercise of clinical thinking. The options are uniformly set to "good", "better", "average", "worse" and "very bad". All completed courses will be filled in anonymously at the end of the semester.

(3) Statistical method

The data were processed and analyzed by SPSS26.0 software, the measurement data were expressed by mean ± standard deviation ($\bar{x}\pm s$) and t-test, the counting data were expressed by example (%), and the ordered classification data were compared by rank sum test. $P<0.05$ indicates that the difference is statistically significant.

3. Result Evaluation

(1) Results of questionnaire survey

As shown in Table 1, the results of the questionnaire show that the reform group prefers the new teaching model to the traditional group, thinking that this model can stimulate interest in learning and enhance the mastery of practical and theoretical knowledge. at the same time, it improves the ability of cooperation and exercises the ability of clinical thinking. there were significant differences in the results of questionnaire survey between the two groups ($P<0.05$).

Table 1. Results of questionnaire survey on teaching effect (%)

Attitude	Traditional group (n=70)	Reform group (n=68)	Z	P
Teaching methods				
Fine	10(14.3)	15(22.1)		
Better	36(51.4)	41(60.3)		
General	18(25.7)	11(16.2)	-2.296	0.022
Poor	5(7.1)	1(1.5)		
Very bad	1(1.4)	0(0.0)		
Learning interest				
Very high	11(15.7)	13(19.1)		
Higher	36(51.4)	45(66.2)		
General	14(20.0)	9(13.2)	-2.174	0.030
Poor	7(10.0)	1(1.5)		
Very bad	2(2.9)	0(0.0)		
Practical operation				
Fine	18(25.7)	23(33.8)		
Better	29(41.4)	36(52.9)		
General	16(22.9)	8(11.8)	-2.282	0.023
Poor	4(5.7)	1(1.5)		
Very bad	3(4.3)	0(0.0)		
Theoretical knowledge				
Fine	16(22.9)	20(29.4)		
Better	30(42.9)	39(57.4)		
General	17(24.3)	9(13.2)	-2.404	0.016
Poor	3(4.3)	0(0.0)		
Very bad	4(5.7)	0(0.0)		
Collaboration ability				
Fine	10(14.3)	25(36.8)		
Better	23(32.9)	29(42.6)		
General	20(28.6)	12(17.6)	-4.395	<0.001
Poor	13(18.6)	1(1.5)		
Very bad	4(5.7)	1(1.5)		
Clinical thinking				
Fine	13(18.6)	17(25)		
Better	20(28.6)	39(57.4)		
General	30(42.9)	10(14.7)	-3.427	0.001
Poor	5(7.1)	1(1.5)		
Very bad	2(2.9)	1(1.5)		

(2) Comparison of statistical results of assessment results

As shown in Table 2, through statistical analysis, it is found that the scores of practical operations are (67.9 ±9.1) in the traditional group and (74.6 ±10.0) in the reform group. The scores of written examinations were (71.5 ±9.5) in traditional group and (75.8 ±8.8) in reform group. The scores of two tests in the reform group were higher than those in the traditional group, and the differences were statistically significant ($t=4.174$, $P<0.001$; $P<0.05$, $P<0.05$).

Table 2. Comparison of examination results between the experimental group and the control group (scores)

Grouping	Number of cases (n)	Operation result	Written test results
Traditional group	70	67.9±9.1	71.5±9.5
Reform group	68	74.6±10.0	75.8±8.8
t	–	4.174	2.785
P	–	<0.001	0.006

4. Discuss

Stomatology education pays attention to the combination of practice and theory, and the training of fine treatment techniques is very important in stomatology education.

However, at present, stomatology education in China often shares the platform of basic teaching with clinical medicine, and the lack of class hours is a common problem in stomatology education in China. Many scholars have used flipped classroom teaching in medical education, and have achieved certain results [3-5]. But at present, the traditional teaching mode has a deep-rooted impact on students, and the vast majority of students' autonomous learning ability is not strong. Affect the teaching application of flipped classroom.

Therefore, under the guidance of the concept of OBE, combined with the rich online teaching resources in the Internet era, this study puts forward a new teaching model-"combining students' micro-video recording with flipped classroom": a diversified teaching model that integrates popular entertainment means of micro-video recording, flipped classroom, team-based learning (TBL) and problem-based learning (PBL). It can effectively attract students' attention and stimulate students' enthusiasm for learning, so as to guide students to study independently. In this study, it can be seen that the new teaching model improves the students' examination scores, and the theoretical examination and skill examination scores of the students in the reform group are significantly higher than those in the traditional group. The reason may be that first of all, students strengthen the memory of abstract knowledge through full study before class, repeated discussion in class and better practice. And a study [6] shows that through autonomous learning before class, students sort out the knowledge to be learned in advance, show and explain the combed knowledge in class, and cooperate with the exchange and interaction between teachers and students can further deepen the understanding and memory of the knowledge; secondly, in order to record a good video, students repeatedly study and watch the video before class, and the practice in class is more serious than the traditional group.

From the aspect of questionnaire, the six indicators show that there are statistical differences. Compared with the traditional teaching methods, the reform and innovative teaching methods are more popular among students. 82.4% of the students in the reform group accept the new teaching mode and learning interest. The higher or higher proportion of the reform group was 85.3%, which was higher than that of the traditional group. Flip classroom combined with students' micro-video recording can greatly improve students' autonomy and enthusiasm in learning, and through group evaluation and classroom defense, students can feel and directly experience the application of what they have learned in clinical work, satisfy their sense of participation and stimulate students' interest in learning. 86.8% of the students think that the new teaching model is not only beneficial to practical operation learning, but also can assist theoretical learning. Before class, students watch the teaching videos and courseware recorded by their teachers, and actively discuss with other students what they are difficult to understand, and some teachers give answers on the public platform, which can promote students' mastery of knowledge. at the same time, students record a small video through clinical practice, and while recording and explaining, concretize the abstract content, which can significantly improve students' practical operation ability. There are obvious differences in the ability of cooperation. The new teaching model is considered to better improve the ability of cooperation and clinical thinking, which is related to group discussion, selection and defense.

There are still some problems in this study. First, the evaluation system of learning achievements is not comprehensive and perfect, and teaching achievements need to be evaluated from more aspects in the future. Second, the individual reform group students' autonomous learning ability is poor, indicating that they cannot well adapt to the online learning module, failed to complete the study on time, and completed the video recording under the supervision and help of the teaching assistant. I prefer to choose the traditional face-to-face teaching mode. These deficiencies need to be improved in the future dental and dental pulp teaching reform.

5. Conclusion

The new teaching model organically combines the theoretical teaching of dental endodontics with experimental operation, which makes up for some shortcomings of the traditional teaching model to a certain extent, and effectively takes students as the main body. It plays an obvious role in promoting the cultivation of students' learning enthusiasm and the ability to analyze and practice. Teachers can use this method flexibly, and other medical courses that pay attention to practice can also be widely promoted.

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