

The study of PBL combined with CBL teaching mode in the English teaching of Stomatology for international students

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Abstract: Purpose: To explore PBL (Problem-Based Learning) combined with CBL (Case-Based Learning, Application effect of CBL teaching model in oral science teaching of MBBS (Bachelor of Medicine & Bachelor of Surgery (MBBS)). Methods: 118 international students from Jinan University in 2016 and 2015 and 60 students from 2016 were selected as the experimental group. The problem-driven teaching method combined with case teaching method was adopted. 58 students from grade 2015 were selected as the control group, and the Lecture-Based Learning (LBL) teaching mode was adopted. After two complete classroom teaching sessions, the students were given in-class test and questionnaire survey. Results: In the in-class test, the total score and average score of multiple choice questions, noun interpretation questions, short answer questions and case analysis questions in the PBL-CBL group were higher than those in the LBL group ($P < 0.05$); The results of the questionnaire showed that the students in the PBL-CBL group had higher satisfaction with the teaching mode than the LBL group ($P < 0.05$). Conclusion: PBL combined with CBL has achieved good results in the full English teaching application of Stomatology for MBBS students in China, which is helpful to improve the teaching quality.

Keywords: Problem-Based Learning; Case-Based Learning; Stomatology; MBBS international student

1 Introduction

High-level and international education for international students is a common feature of world-class universities, and the degree of internationalization of higher education in advanced countries can be reflected in. Today, higher education is booming nationwide, and the internationalization level of domestic colleges and universities is rising steadily. Known as "the highest institution of higher learning among overseas Chinese", Jinan University has outstanding international characteristics and actively carries out international exchanges and cooperation, vigorously promoting the spread of Chinese culture. "Stomatology" is very important in clinical medical education, but it involves a wide range of knowledge and a lot of content, leading to different teaching effects in colleges and universities. At present, the "Stomatology" of MBBS students in our school mainly adopts the traditional LBL teaching mode. The course content is boring and students' interest in learning is low. PBL teaching mode means that students take the form of group discussion under the teacher's participation and guidance, and put forward, discuss and study around a complex topic based on practical problems, emphasizing on improving students' autonomous learning ability[1]. CBL teaching mode refers to that teachers select typical case materials and motivate students to participate in classroom teaching around the case, aiming at allowing students to flexibly use professional knowledge, analyze and solve problems from multiple perspectives[2]. In order to improve the teaching quality of "Stomatology" for MBBS students in China, we introduce PBL and CBL teaching model into the English teaching of "Stomatology" for international students, and compare it with LBL teaching model, so as to promote the reform of the teaching model of "Stomatology" for MBBS students in China, fully mobilize and stimulate students' learning initiative. To cultivate students' spirit of independent innovation and independent exploration.

2 Materials and methods

2.1 General Information

A total of 118 students from Jinan University in 2016 and 2015 and 60 students from 2016 were selected as the experimental group. PBL combined with CBL teaching model was adopted. There were 34 boys and 26 girls with

an average age of 21.6 years old. 58 students from grade 2015 were selected as the control group and adopted the LBL teaching model, including 22 male students and 36 female students with an average age of 22.3 years old. Their average theoretical scores of the last semester were 83.1. There were no significant differences in gender, age and grades of the students ($P > 0.05$), indicating comparability.

2.2 Methods

2.2.1 Teaching Methods

The international students in the experimental group adopted the teaching mode of PBL and CBL. In class, the teachers carried out two classes of oral fixation repair (total crown, inlay, onlay, fixed bridge) and oral implant repair technology based on the teaching syllabus of Stomatology. Each class lasted for 3 class hours, and the total learning time was 6 class hours. Sixty international students in the PBL-CBL group were randomly divided into 10 groups with 6 members in each group. All group members were required to work together to complete the case analysis. The specific teaching process is as follows: (1) In the first lesson, analyze cases and ask questions. Based on the standards of the syllabus of Stomatology, the teachers will give specific clinical cases and design relevant questions. Team members discussed the case and the problems designed by the teacher, and looked for solutions to the problems. (2) In the second lesson, look up the information and make the plan. After the first class, each group member, with the remaining questions, consulted relevant materials independently to find effective learning resources. These resources include textbooks, cutting-edge academic journals, books for extracurricular tutoring and online resources such as learning forums. Next, the team members summarized the learning situation and made a preliminary treatment plan for the cases. (3) The third lesson, focus on discussion, summary and improvement. First, the group members review and share the relevant knowledge and learning materials they have independently consulted, report the initial treatment plan to the group, and conduct a problem-centered discussion to solve the remaining problems from the previous two classes. Then, after a thorough review and analysis, the group members work together to develop a final treatment plan. Finally, the teachers made case comments on the discussion results and summarized them. The foreign students in the control group adopted the LBL teaching mode. Before teaching, students were asked to preview the course briefly. In class, according to the teaching syllabus of Stomatology, the teachers carried out two class teaching sessions centering on two chapters of oral fixation repair (total crown, inlay, onlay, fixed bridge) and oral implant repair technology. Each class teaching time was 3 class hours, and the total learning time was 6 class hours. After class, students are required to review what they have learned in class, and no discussion is arranged in class or after class.

2.2.2 Evaluation of teaching effect

After two complete classroom teaching sessions, the students in the PBL-CBL group and the LBL group were given in-class tests and questionnaires. The in-class test included objective questions (multiple choice questions, noun interpretation questions) and subjective questions (short answer questions, case analysis questions), which mainly tested the international students' firm grasp of basic knowledge and their ability to analyze clinical cases. At the same time, a questionnaire survey was conducted for international students in the PBL-CBL group and the LBL group. The questionnaire content was the evaluation of the teaching effect of the two groups of international students on the PBL combined CBL teaching model and the LBL teaching model respectively. The questionnaire mainly consists of 10 questions, including learning efficiency, learning interest, learning initiative, teamwork ability, language expression ability, clinical thinking ability, problem analysis ability, knowledge understanding ability, literature retrieval ability and teacher-student communication ability. Foreign students evaluated the satisfaction of the teaching model according to the specific situation.

2.3 Statistical processing

SPSS 25.0 software was used for data analysis and processing, measurement data were expressed as ($\pm s$), and comparison between groups was conducted by t test. Count data were represented by (n, %), χ^2 test was used, and $P < 0.05$ meant that the difference was statistically significant.

3 Experimental results

3.1 Results of in-class test

Table 1 Comparison of in-class test results between Ppl-CBL group and LBL group (score, \pm s)x⁻

	Objective Questions			Subjective Questions			Total score value
	Multiple choice questions	Noun explanatory questions	Total score value	Short answer	Case analysis questions	Total score	
PBL-CBL group	25.15 + / - 1.81	15.97 + / - 1.60	41.12 + / - 2.52	16.54 + / - 1.37	25.02 + / - 1.67	41.56 + / - 2.14	82.68 + / - 3.58
LBL group	21.40 + / - 2.12	14.07 + / - 1.73	35.47 + / - 2.70	13.89 + / - 1.54	23.00 + / - 2.02	36.89 + / - 2.60	72.35 + / - 3.70
<i>t</i>	10.354	6.184	11.774	9.883	5.920	10.653	15.404
<i>P</i>	0.000	0.005	0.000	0.008	0.030	0.000	0.020

Analyze the scores of students in PPL-CBL group and LBL group in the in-class test. The average scores of multiple choice questions (25.15±1.81 points), noun interpretation questions (15.97±1.60 points), short answer questions (16.54±1.37 points) and case analysis questions (25.02±1.67 points) in Ppl-CBL group were significantly higher than those in LBL group (21.40±2.12 points, 14.07±1.73 points, 13.89±1.54 points, 23.00±2.02 points);The total score of PPL-CBL group (82.68±3.58 points) was also significantly higher than that of LBL group (72.35±3.70 points), and the difference was statistically significant (P<0.05), as shown in Table 1.

3.2 Results of questionnaire survey

Among the recovered questionnaires, 118 were valid. The questionnaire showed that 81.67% of students in the PPL-CBL group were satisfied with the teaching effect, while only 65.52% in the LBL group, the difference was statistically significant P < 0.05, as shown in Table 2.

Table 2 Comparison of teaching satisfaction evaluation of foreign students in PPL-CBL group and LBL group (n, %)

	PBL-CBL group (n=60)		LBL group (n=58)		chi-square	<i>P</i>
	Satisfied	Not satisfied	Satisfied	Not satisfied		
Improve study efficiency	51 (85.00)	9 (15.00)	36 (62.07)	22 (37.93)	8.006	0.005
Increase interest in learning	52 (86.67)	8 (13.30)	35 (60.34)	23 (39.66)	10.549	0.001
Increased learning initiative	53 (88.33)	7 (11.67)	36 (62.07)	22 (37.93)	10.975	0.001
Improve teamwork skills	49 (81.67)	11 (18.33)	37 (63.79)	21 (36.21)	7.767	0.029
Improve your verbal skills	50 (83.33)	10 (16.67)	35 (60.34)	23 (39.66)	7.737	0.005
Improve clinical thinking skills	55 (91.67)	5 (8.33)	34 (58.62)	24 (41.38)	17.374	0.000
Improve your ability to analyze problems	54 (90.00)	6 (10.00)	36 (62.07)	22 (37.93)	12.713	0.000
Improve knowledge comprehension	56 (93.33)	4 (6.67)	38 (65.52)	20 (34.48)	14.084	0.000
Improve literature retrieval ability	49 (81.67)	11 (18.33)	34 (58.62)	24 (41.38)	7.508	0.006
Improve communication skills between teachers and students	50 (83.33)	10 (16.67)	35 (60.34)	23 (39.66)	7.737	0.005

4 Discussions

To sum up, the traditional LBL teaching mode helps teachers impart core knowledge and important concepts to students, which is a more economical and effective theoretical teaching mode[3]. However, this three-point first-line teaching mode of "preview, lecture and review" rarely involves discussion and autonomous teaching design, students can only passively absorb the knowledge taught by teachers in class[4]. Nowadays, with the continuous development of medical education and the transformation of the training mode of clinical teaching skills, the training objectives of medical students in colleges and universities have also changed, and the traditional LBL teaching mode has been difficult to meet the needs of modern education. How to improve students' ability of clinical thinking, independent analysis and problem solving has attracted attention.

In the past decade, there have been numerous studies affirming the advantages of PBL and CBL teaching models. For example, some studies have proposed that PBL teaching method not only provides students with independent learning space, but also arouses students' enthusiasm in learning, improves students' teamwork consciousness, and cultivates students' critical thinking and problem-solving abilities[5; 6]. At the same time, CBL teaching method expands students' clinical thinking ability, improves their doctor-patient communication ability, and helps them consolidate knowledge and master skills[7]. In view of the above advantages, we combine PBL and CBL teaching models, which complement and reinforce each other, so as to maximize our teaching effect. The results show that the PBL combined with CBL teaching model achieves good teaching effect in the English teaching application of Stomatology for MBBS students in China, improves the teaching quality of Stomatology for MBBS students in our school, and has certain guiding significance. In the in-class test, the objective question type mainly tested the students' firm grasp of basic knowledge. As can be seen from Table 1, the average score of objective question type in PBL-CBL group (41.12 ± 2.52 points) was significantly higher than that in LBL group (35.47 ± 2.70 points). The data indicated that the students in the LBL group did not have a strong grasp of basic knowledge. The main reason is that in the traditional LBL teaching mode, cramming input will make it difficult for students to digest the classroom knowledge and reduce the learning efficiency. Secondly, the emphasis on the improvement of students' clinical ability and quality cultivation is far from enough, which leads to the difficulty for students to make active use of learning. Subjective question type mainly measured students' ability to analyze clinical cases and clinical thinking ability. Data from Table 1 showed that the average score of subjective question type in PBL-CBL group was higher (41.56 ± 2.14 points) than that in LBL control group (36.89 ± 2.60 points). It indicates that the students in the PBL-CBL group have improved their ability of clinical case analysis and clinical thinking. The main reason is that the students in the PBL-CBL group must think independently and find solutions in the learning process, so as to improve the students' ability of literature review and retrieval as well as their ability of independent analysis and problem solving. In the process of class discussion, students' clinical thinking, expression and communication skills are also improved. At the same time, students' understanding of the learning content is deepened and the difficulty of learning is reduced[8]. As can also be seen from Table 2, the questionnaire results show that more than 81.67% of the students in the PBL-CBL group believe that this teaching mode can improve learning efficiency, learning interest, learning initiative, teamwork ability, language expression ability, clinical thinking ability, problem analysis ability, knowledge understanding ability, literature retrieval ability and teacher-student communication ability. The same data was only 58.62% in the LBL group. Therefore, students are more satisfied with the teaching model of PBL-CBL group.

Previous studies have shown that PBL combined with CBL teaching model has been implemented in clinical teaching[9]. For example, Wu Xiaoxia et al. applied PBL combined with CBL teaching method to oral clinical teaching, and pointed out that under this teaching mode, students' learning interest, clinical thinking ability, analytical and problem-solving ability, language expression ability, and teamwork ability were improved. In another study, the author applied this model to the standardized training of TCM physicians, and concluded that PBL combined with CBL teaching method can promote the cultivation of students' innovative ability and innovative thinking, and also contribute to the improvement of teachers' teaching level. These findings are in general agreement with our conclusions. In the teaching model of PBL and CBL, students' potential in independent learning, analysis and understanding, exploration and discovery, cooperative communication and other aspects have been fully stimulated [10].

In addition, although the teaching model of PBL combined with CBL has achieved good teaching effect, we also found that there is still room for improvement. First of all, for students with poor self-discipline, the process of looking up and collecting learning materials after class will occupy too much spare time. Students may choose to

deal with teaching tasks due to tight learning time, and lose their expected learning initiative. At the same time, for students with weak grasp of basic knowledge, the class progress is too fast, leading to low efficiency in receiving systematic knowledge and insufficient participation of students, which is also not conducive to teaching. Therefore, it is necessary for teachers to take into account the actual situation of each class and each student more carefully in the teaching work, analyze the specific situation, spend more effort on the design of teaching content, improve constantly, and promote the reform of the teaching model of Stomatology.

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