

Framework on Problem-based Learning in the Practical Thinking of Histology and Embryology Teaching

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Abstract—Problem-based teaching method is one prevailing new mode for medical education in our country. Though received wide recognition and widely used in medical college, there are some problems. During the teaching for histology and embryology by applying the problem-based teaching method, some improvement should be made so that it can conform to the actual situation for the teaching of medical major in our country. It has been proved by many practices that problem-based teaching method can practice the students' overall integrative ability and stimulate the interests for learning which is of great significance for cultivating students' initiative ability. This paper mainly discuss the basic steps for problem-centered teaching method, the problems during the implementation of problem-based teaching method, the practice for the problem-based teaching method as well as the functions and features of problem-centered teaching method.

Keywords- *problem-based; histology and embryology; practice*

I. INTRODUCTION

With higher and higher employment pressure, the education for undergraduates receives unprecedented attention. There is increasing requirements for the college education, which is especially true for the medical education in college since the cultivation of medical talents with innovation is the responsibility of medical teacher. The students in medical college should have solid medical knowledge, healthy physical and mental quality, excellent creative awareness etc. The traditional teaching modes are teacher-centered, which could not satisfy the requirements for innovative talents with high quality by the society. In order to promote the healthy development of medical career, problem-based teaching method should be applied to cultivate the students' creativity and innovation. The educators for medical education in college should intensify the reform, dare to innovate and use scientific and advanced teaching mode to organize the teaching activity.

II. THE BASIC STEPS FOR THE PROBLEM-CENTERED TEACHING METHOD

There are many steps in the problem-centered teaching mode. Firstly, the teachers should pose several questions related to the materials or courses that should be taught and put forward them to the students, namely posing problems to the students; secondly, the teachers should recommend related resources, information or the relevant materials to the students by combining the questions posed and properly guide the students for self-exploration; thirdly, the students are required to think independently and discuss in groups and obtain the primary results; and then the teachers evaluate and analyze the results or views the students obtained and guide the students for the uncontroversial problems or the important language points in the courses or the teachers can give some hints to the problems; finally, the teachers analyze the problems together with the students, including relevant theories, disciplines and concepts.

III. THE PROBLEMS EXISTING DURING THE IMPLEMENTATION OF PROBLEM-BASED TEACHING METHOD

As a new teaching method, when the teachers apply the problem-based teaching method to carry out their teaching tasks, they should guide the students to test the scientificity of the knowledge they obtained by concrete examples. This method started from Europe and North America and the medical college in our country started to use this method from the very beginning of 21 century. The problems existing in the problems-based teaching method are as follows:

Firstly, the students' ability is limited. During the teaching of histology and embryology, the students have only learned the anatomy, cytobiology and other basic medical courses. Since many courses have been reformed, the teaching for cytobiology should be carried out after the histology and embryology. Therefore, the students have

little knowledge about the biology which makes it difficult to grasp the knowledge related to the clinical aspects. Therefore, the problem-based teaching is hard to implement and is restricted. For example, the teaching for connective tissues should design problems relevant to pollen allergy and then carry out the teaching activity to make the students discuss the multiple cells and structures of connective tissues so as to analyze the problems and solve the problems. Secondly, there is lack of textbook that takes the problems as the basic teaching method. In order to use this teaching method, the limitations between multiple disciplines should be broken. And the traditional teaching system should be broken. The medical knowledge should combine the relevant knowledge about histology, anatomy, biochemistry, embryology and so on while the clinical disciplines should integrate surgery, internal medicine and other professional knowledge to absorb the advantages of traditional teaching methods and make all discipline combined together. However, there is short of the relevant unified teaching materials about clinical disciplines and basic disciplines hat edited by the teachers of multiple disciplines.

Thirdly, there are some limitations about the applicable range for the problem-based teaching method. Since the application of this teaching method by medical college is at the very beginning, the application of such method for teaching is usually restricted to some discipline. The integration of all discipline is not so convenient which cannot present the teaching advantages of this teaching method and will affect the teaching effect to some extent.

Finally, there is lack of scientific system for evaluating the problem-based teaching method. Unlike the traditional teaching method, the problem-based teaching method and teaching idea is not to test the students' results by traditional written test. The evaluation and assessment of the student's theoretical or practical knowledge is only one important step during the teaching process. However, in the problem-based teaching method, the evaluation for the students' scores is not mature at nowadays, which requires further perfection.

IV. THE PROBLEM-BASED TEACHING PRACTICE

Since there are some problems for problem-based teaching methods, some reforms should be made for applying this method in the teaching of histology and embryology so that it can conform to the actual situation in our country. What is important is cultivate the students' self-study habits and then organize the students for

discussion. After summary, the teachers should guide the students to explore in the form of questions so as to make the students put forward their opinions or views.

A. *Well-prepared for self-study*

Before teaching, the teachers should meet the students and work out the detailed plans for teaching so that the students can know the contents of courses in advance. The teachers should provide the clinical cases or materials relevant to the courses to the students so that the students can do self-study and preview the relevant language points in advance. And then apply the Internet and so on to survey for the required documents or materials to make the students summarize by themselves. Though self-study is an ancient method, it is worthy of promotion and advocacy. Many students in our country are lack of the willingness and spirits for self-study for all the time, which is related to the traditional teacher-centered teaching mode. The students get used to the spoon-fed passive learning, which oppresses the students' learning enthusiasm and innovation.

B. *Discussion*

Before the class, the students should be divided into several groups under the guidance of the teacher and each group should discuss by the clinical case or materials brought by the teachers so as to deeply grasp the structure of histology and embryology. Discussion is a common method which is frequently seen in the daily classes and it was popular in German at first then is brought in to our country. Many practices fully prove that discussion in class is a good complementary method. After discussion, the teachers can fully understand the overall situation whether they grasp the knowledge or not and the individual situation. The teachers can timely adjust the teaching contents and teaching progress by the grasp condition of the students so that to make the teaching more effective and targeted.

V. THE OVERALL DISCUSSION RESULT

After the group discussion, each group can ask a representative to summarize the discussion results. The teachers should fully understand and grasp the comprehension situation of the students to make summary about this discussion. During the summary, the teachers can make no comments about the various opinions about the students. If there is big mistake in comprehension or mistakes in principle in the big framework, the teacher can only point it out. By guiding and encouraging the students

to replace thinking and analyze the problems, the teachers can create tolerant classroom activity which can stimulate the students to explore and learn actively.

A. *exploration of knowledge*

The teachers can spare some time for the students to think. By designing some question, the teachers can guide the students to look into the materials and explore new knowledge initiatively so as to propose their own viewpoints which can be transferred to the teachers by homework or presentation. The process for exploration knowledge can stimulate the students the motivation for studying and exploration knowledge, which can cultivate the students' excellent creative ability. During the histology and embryology, problem-based teaching method should design various questions according to the textbook, such as divergent questions, exploratory questions and so on. The teachers should guide the students to initiative analyze and think. In class, the teachers should read the teaching contents carefully and think about questions from the viewpoints of the students and give tips for crucial and important questions. During the teaching, the teachers should know clearly the teaching objectives and pose questions to the students. For example, before teaching the pulmonary alveoli, the teachers should poses some questions such as how the lung breathe and exchange gas to guide the students explore all by themselves. The method by posing questions and analyzing can help the students think independently and grasp the theoretical knowledge during thinking. The teaching of medical knowledge cannot proceed without the experiment courses which can testify all the acquired theoretical knowledge. The teachers should pose practical questions during the process that the students observe the experiment of section so that the students can observe and think with these questions. After the experiment, the students should be divided into several groups for discussion. As for some difficult questions, the teachers can guide the students to think and discuss from easy to difficult. Meanwhile, multimedia courseware or experimental models should be applied to create vivid images. The vital part for posing questions is to pose a series of questions with enlightenment or different level for it emphasizes the guidance effect of the teachers. The inspiring questions can stimulate the students to think initiatively. Many teaching practices have proved that problem-centered teaching method is easily accepted by the students and is effective.

VI. FUNCTIONS AND FEATURES OF PROBLEM-CENTERED TEACHING METHOD

Application the problem-centered teaching method during the histology and embryology can practice the students' comprehensive generalization ability, reading ability; improve the students' strain capacity and language competence. Meanwhile, it can stimulate the students' enthusiasm and interests for learning medical knowledge which is helpful for the cultivation of students' innovation.

A. *Cultivation and improvement for students' thinking ability and reading ability*

Problem-centered teaching method has higher requirements for the students. It requires the students to read the reading materials repeatedly. Only by fully understanding the textbook can the students consult various references according to the clinical cases or materials recommended by the teachers and analyze, reason and testify the knowledge further. Especially during the group discussion, there are many problems that have not been thought of; the students have to grasp the essence of the problems, analyze the acquired language points can obtain the conclusions by reasoning. A series of thinking activity can effectively promote the students independence and agility of the students' thinking ability.

B. *Motivating the students' self-study and arousing the students' enthusiasm*

Unlike the traditional spoon-fed teaching methods, problem-centered teaching method can change the students' position and students is an important part in the class for they are not only the receiver of information but also the proposer of the information and knowledge. The students' thinking is not restricted any longer and they can testify if only they have new ideas. If the students have new thinking and new idea, they will explore positively and analyze it by collecting materials.

C. *Helpful for cultivating students' language competence*

By discussion and summary, the students will pay attention to summarize their viewpoints and present it by oral language, and a series of manifestation, expressing ideas, refuting others' viewpoints and so on are the training and improving of the students' expressing ability.

D. Cultivation and improving the students' ability for analyzing questions and handling questions

Since the clinical cases or materials recommended by the teachers are difficult to certain degree, the students, therefore, should closely connect the actual knowledge with the knowledge they acquire so that they can solve the problems by combining the theory with the practice. By preparing the discussion materials, the students' ability for applying the theoretical knowledge to analyze problems and handle problems is improved. Meanwhile, by preparation and discussion, the students' evaluation ability and feedback ability are improved as well.

VII. CONCLUSION

Though our country has made several achievements in the reform and the exploration for task-centered teaching method, there are also some deficiencies and problems, such as the short of equipment and space, consumption much time and energy during the implementation of this method and higher requirements for teachers etc. Further improvements should be made in the subsequent teaching practice and the frequent communication with the students is necessary.

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