

A Preliminary Discussion on the Flipped Classroom Model in Medical Education

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Abstract: With the passage of time, the innovative application of information technology, flipped classroom has gradually become a new teaching mode in the field of modern education, and is applied in the field of medical education as well. China's flipped classroom education reform is still in the initial stage, many educators have a bias in the understanding of the flipped classroom model, resulting in boring teaching activities, and cannot achieve initial results in practice. In particular, medical courses involve cumbersome professional knowledge, and the education model involved in classroom teaching cannot be widely practiced in the field of education. This paper explores the construction of flipped classroom teaching model and expounds the application advantages of flipped classroom teaching model, aiming to optimize the application of flipped classroom model in medical teaching, and then improve the quality of medical classroom teaching and help students develop healthily.

Keywords: Medical science; Flipped classroom; Teaching

Online publication: April 2, 2025

1. Introduction

With the innovative development of science and technology, medical education is also moving towards a better and faster direction. As one of the new models of modern education, flipped classroom has been gradually recognized by colleagues in the medical field, and is a new field involved in the reform of education and teaching in China. Due to the limited establishment of medical colleges and universities and complex educational problems, professional teachers should treat the flipped classroom teaching mode correctly and strengthen the systematic research, exploration and practice of flipped classroom. Only in this way can professional teachers truly improve the quality of professional education, stimulate students' interest in professional knowledge learning, guide students to establish correct values and value orientation, and become innovative talents with international competitive advantages.

2. The construction of teaching mode based on flipped classroom

Flipped classroom is officially proposed by scholars Jonathan Bergman and Aron Bergman, and breaks the traditional classroom mode, advocating that teaching content should be uploaded to the Internet, students should complete extracurricular learning independently, and precious class time should be used for subject knowledge analysis and homework guidance^[1,2]. Different from the traditional classroom teaching mode, students review after class mostly based on interest and inquiry, subvert the traditional teaching mode, and let students complete independent study before class under the guidance of teachers. Classroom teaching activities supplement and deepen the independent preview. The core elements of flipped classroom are composed of multiple parts: flexible environment, learning culture, teaching planning content, professional teachers, online activities, students' personal experiences, and diversified learning platforms.

In the flipped classroom teaching process, teachers no longer simply impart subject knowledge, but guide students to share learning results in the form of group cooperation. The teacher emphasizes that students should be good at finding problems, understanding the perception of learning, and collecting learning materials. After each learning group has shared a learning experience, the teacher will make a brief summary or point out other questions, and then the students will answer them^[3,4]. The teacher can also ask the students to set questions and discuss the answers within the group. In addition to sharing learning experiences between students, teachers can also encourage students to express their opinions, and set up group debate competitions to debate the parts in question, thus deepening the understanding and deepening of the classroom knowledge.

The evaluation of students' professional performance is particularly important in flipped classroom teaching, and the evaluation of students' academic performance should be consistent with the teaching activities. The important component of flipped classroom mode is the evaluation of students' independent learning effect, which facilitates professional teachers to optimize the subject education plan and make appropriate adjustments to classroom teaching activities. In the medical teaching process, the flipped classroom is applied. The teacher distributes the learning list before the course starts, and the students consult the materials to complete the answers and bring them into the class. The teacher scores the students' personal performance and includes them in the final evaluation^[5,6]. Individual scores depend on students' participation in class and online learning, as well as students' scores in written exams.

3. Advantages of flipped classroom teaching mode

3.1. Effectively enhance students' independent learning ability and deepen students' understanding of professional knowledge

In the process of medical teaching in the past, teachers mostly used classroom time to complete the teaching of theoretical knowledge, and students could only passively receive professional knowledge. Teachers could not grasp the situation of students' knowledge learning in time, and students could only memorize professional knowledge before the examination, unable to grasp the knowledge from the root. With the end of the professional class, students will be faced with more tedious learning tasks, not only to master the basic theoretical knowledge, but also to strengthen the understanding and application of knowledge, which will have a very profound impact on students' future clinical work. For example, in the process of clinical learning, medical students will choose proton pump inhibitors for acid suppression therapy to implement preventive measures for patients with chronic obstructive disease. The reason for this practice can be understood as "inhibition of hypercapnia". Flipped classroom teaching mode can stimulate students' subjective initiative. Only after students have preliminarily

mastered the classroom content before learning can they devote themselves to it, take the initiative to explore deeper issues, and help students think deeply ^[7,8]. In addition, students' independent learning before class is convenient for students to master their learning progress and teach students according to their aptitude, ensuring and improving students' learning effectiveness.

3.2. To achieve in-depth exchanges between students, teachers and students

Flipped classroom is different from other teaching modes. Teachers are no longer in the dominant position. While respecting students' dominant position, they guide students to participate in group cooperative research. Students are required to find, explore and solve problems together with group members, and are also required to question the views and opinions of other groups, which is conducive to improving students' practical operation ability and enhancing their ability to integrate and analyze higher-order knowledge ^[9,10]. In the traditional classroom teaching process, the interaction between teachers and students is limited to the classroom, but in the flipped classroom teaching mode, with the help of WeChat group, QQ group and other network tools in the Internet, real-time online communication is maintained to ensure the participation of teachers and give full play to the guiding role of teachers, which can also ensure students' independence and cultivate students' independent communication ability. The depth and breadth of communication can stimulate the internalization of students' knowledge, which is beneficial to the timely optimization and integration of teachers' teaching mode and teaching content.

3.3. The practice of the medical profession should be more deeply embedded in the current medical environment

As a medical professional teacher, they should not only have a strong theoretical knowledge, but also have the corresponding practical operation ability, and guide students to participate in practical exploration. Most students are bystanders in daily life, not only did they not participate in treatment decisions, but also had no opportunity to implement relevant medical operations on patients. As a result, the diagnosis and treatment of diseases of students still stay in books and cannot be combined with practical activities to complete the transformation of knowledge. For example, many medical students enter the medical post after graduation. When they participate in clinical work as medical students, they cannot independently complete basic medical operations such as chest puncture and abdominal puncture. For common diseases such as pneumonia and gastric ulcer, it is difficult to independently complete the formulation of medical plans. Through flipped classroom teaching mode, teachers have more time in clinical study to improve students' ability to deal with practical problems through case teaching. They can learn massive real cases and video learning materials online to deepen students' understanding of theoretical knowledge and perceptual understanding of practical operations.

4. The application of flipped classroom mode in medical teaching

4.1. Peer teaching and joint teaching mode

By adopting the peer teaching method, teachers can let students get a full preview in class, and get in-depth communication and interaction in class, so as to promote communication and communication among students, and cultivate students' cooperative dedication and innovation ability. In clinical practice, in the face of complex diseases, it is necessary to rely on their professional knowledge and technology, through consultation and communication, to overcome the confusion, constantly promote the progress of treatment, and prepare for the future medical development ^[11,12]. Through the adoption of peer teaching and joint teaching mode, students

through interactive ways, such as browsing and sharing, to obtain more abundant information, and according to this information, combined with relevant knowledge, to take more personalized ways, such as group collaboration, practical inquiry, to help students better understand and master knowledge to avoid wasting time. The use of peer teaching and joint teaching mode can significantly improve the efficiency and quality of professional classrooms.

4.2. Question-based instruction

PBL pays attention to students' learning initiative and helps students to think independently, explore and sum up knowledge by providing learning tasks with practical characteristics. This teaching mode has been adopted by many colleges and universities. According to the literature, the PBL teaching mode applied by David Geffen Medical School will be divided into different parts, dividing a case into two parts: the first day and the second day, so that students can learn through practical activities and acquire more knowledge. On the first day, students gather information about their medical history and search it carefully to identify potential problems early on. On the second day, they will use electronic tools to communicate the information they gather with others for better understanding and exploration. On the third day, students will take a different perspective on the information collected and suggestions made, as well as an assessment of the day's laboratory situation, in order to better complete the first day's work ^[13,14]. Japan introduced the PBL program at Tokyo Women's Medical University in 1990. Many universities have made it an important course, and it is widely used in master's and doctoral studies. At present, medical students are also achieving good results. Some researchers use PBL to improve college epidemiology experiment courses, and the results show that PBL can help students establish good learning habits and enhance learning results by guiding students to think and explore. Obviously, the focus of PBL class is to help students obtain relevant information through various ways, such as through the Internet, searching databases, reference literature, viewing relevant videos, so as to cultivate their independence, exploration, practicality and comprehensive ability, and encourage them to explore, dig and improve, so as to improve their learning enthusiasm and confidence.

4.3. Case teaching model

Case teaching originated from Harvard Medical School. Case teaching in Harvard Medical School is regarded as an effective independent learning mode. It is based on actual cases and combined with students' independent learning ability, so that students can acquire professional knowledge in practice and better understand what they have learned. In 2020, the clinical major of Nanjing Medical University adopts the multi-disciplinary structure, taking cell biology as the backbone and combining various disciplines to carry out the case teaching method, which has achieved good teaching results and also triggered the research on CBL teaching. The research shows that the writing of cases and the arrangement of questions raised must be closely combined with the rhythm of learning, otherwise there may be too many knowledge points to learn, and the difficulty of learning will increase, which will lead to the failure to effectively grasp the learning results, and even the situation of forgetting may cause the learning results to become chaotic ^[15]. In Peking Union Medical College Hospital, students in the "4+4" pilot class of 2019 and 2020 were selected as the research objects. They realized a more effective knowledge dissemination and mastery by using the flipped classroom method under the CBL teaching mode and the Likert scale based on CBL. Thus, helping students to grasp and apply the knowledge points in depth. In short, this teaching method can be greatly improved, and students will be actively involved. This learning method is very effective, which can help students better understand and grasp the symptoms, judgment and prognosis

of common medical problems in clinical practice. From the perspectives of physiology, pathophysiology, dissection, therapeutics, and other professional aspects, a variety of academic perspectives are selected for in-depth discussion and analysis to better grasp and apply common medical problems and can be more effective in treatment and prognostic judgment.

4.4. Diversified evaluation and optimization of teaching mode

Flipped classroom is regarded as a new model of education, which is still in the exploration stage. It is crucial for its teaching effectiveness and teaching quality evaluation, and it should be continuously and objectively explored and learned. Therefore, professional teachers must evaluate the efficiency of this model through regular tests, and after using this teaching model, the quantitative evaluation of flipped classroom has high operability, which is conducive to increasing students' enthusiasm. In this way, students can be guided to understand the characteristics of the subject and apply it proficiently in future work practice. Scholars from the Affiliated Hospital of Southwest Medical University used their unique scale and questionnaire to deeply explore the advantages and disadvantages of flipped classroom teaching. The results show that this new model can greatly stimulate students' enthusiasm for learning, and can bring more references and inspirations to future learners. With the continuous advancement of social development, the research of evaluation index system has become more and more important. Some researchers have made remarkable progress in reading course videos independently, participating in discussions in online communities, improving personal homework, and improving test scores. There has been a big shift in the process of independent learning in the classroom, and overall, the evaluation indicators need to be set fairly and equitably to be truly effective. It is also closely related to the concept of comprehensive and healthy development of students and the cultivation of diversified talents, so students' learning cannot be evaluated solely by the grades of learning questions. In particular, medicine is a comprehensive discipline based on theory and practice, which requires not only a solid theoretical foundation, but also practical ability.

5. Conclusion

To sum up, the number of medical students in China's medical colleges and universities is gradually increasing, but the quality of the training is uneven and does not meet the health needs of the people. The training mode of medical talents in China needs to be optimized to help the innovative development of talent training. Compared with traditional medical teaching, flipped classroom teaching plays a positive role in improving students' independent learning and innovation and cultivating compound medical talents. China should widely carry out the reform of teaching mode, strengthen exchanges at home and abroad, learn from each other and practice effective teaching methods, to raise the level of medical education in China to a higher level.

Disclosure statement

The author declares no conflict of interest.

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