



# Exploring Medical Education Models in the Post-epidemic Era

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**Abstract.** The new coronary pneumonia has brought a tremendous impact to various fields of society, accelerating the change and innovation of the concept, form, content and talent training methods of education and teaching in colleges and universities. Medical education has the characteristics of multidisciplinary intersection, focusing on the multidimensional training of learners' knowledge, skills and attitudes in the education process, and how to make full use of the network and multimedia means to improve online medical education in the post-epidemic era has become a medical education in the post-epidemic era, how to make full use of the Internet and multimedia to improve online medical education has become an urgent issue for medical education research. The article attempts to explore the optimal education model for medical education in the new era from horizontal and vertical perspectives.

**Keywords:** post-epidemic era; medical education; teaching models

## 1 Introduction

The new coronary pneumonia has brought a huge impact on all areas of society and has accelerated the changes and innovations in the philosophy, form, content and training methods of university education. Medical education is dissimilar from other disciplines: education in other disciplines often separates theoretical education from practical education, with theoretical education fulfilled during university studying, while practical education is usually completed after entering society, during internship and work, focusing on cultivating highly sophisticated and specialised talents; whereas medicine has the characteristics of multi-disciplinary crossover, focusing on cultivating "elite" talents. In order to achieve the purpose of medical education, the apprenticeship (experiential) medical training model is used abroad, while the problem based learning (PBL) teaching model is widely used in China <sup>[1]</sup>. Some scholars have suggested that "medicine is an imperfect science and a professional art", and that medical education is immature from its inception and needs a continuous improvement. In the post-epidemic era, how to make full use of the Internet and multimedia tools to improve the shortcomings of online medical education and traditional teaching model has become an important and urgent issue for medical education research. In order to select the most

advantageous medical education mode at present, this paper tries to explore the optimal education mode of medical education in the new era from horizontal and vertical perspective.

## **2 Longitudinal comparison of educational approaches**

### **2.1 PBL teaching**

PBL is a teaching mode that achieves teaching objectives through problem solving and learning inquiry <sup>[2]</sup>. The core of PBL is problem solving, and the main body of students' discussion, and the teacher only acts as a guide in this process <sup>[3]</sup>. In the new era of China's medical school teaching and college education model innovation practice, PBL teaching mode plays an important role, it can further enhance students' interest in learning, cultivate the learning of independent learning ability, compared with the traditional education and teaching methods, has a significant innovation and superiority, in line with the basic requirements of the new era of doctors teaching practice.

### **2.2 Teaching CBL**

CBL teaching is a new mode of teaching basing on case teaching. In the process of CBL teaching, teachers guide students through the basic lesson plan and prepare corresponding case studies. CBL teaching is also a student-oriented teaching mode, which focuses more on the specific teaching of cases, and the effect and quality of teaching is related to students' participation and whether they accept the new teaching mode <sup>[4]</sup>. There is a strong relationship between the effectiveness and quality of teaching and learning and the students' engagement and acceptance of the new teaching model in the process, teachers are required to supervise and manage the teaching process, further enlivening the classroom atmosphere and mood, and to give full attention to students with relatively weak communication and expression skills during the course or in the teaching process.

### **2.3 TBL teaching**

Team-Based Learning (TBL), also known as Team-Based Learning, is an innovative teaching strategy and model in which the class is divided into teams to learn and solve problems through self-study, reflection, discussion and presentation. Team-based learning is a student-centred approach that returns the ownership of learning to the students and transforms the teacher's role into that of a facilitator and guide. This teaching strategy and model not only develops students' team spirit and independent learning skills, but has also been shown in experimental studies to improve students' academic performance <sup>[5]</sup>.

The PBL, CBL and TBL teaching models, although they have good superiority and practical value comparing to traditional teaching models, are more student-initiated learning models, the student as the main subject, which can have an impact on students'

systematic learning of medical theory and knowledge <sup>[6]</sup>. At the same time the limitations of the course make the content limited and does not allow the full knowledge of the textbook to be expressed in the form of problems or cases, which will affect the overall teaching and learning. At the same time, simple problems or case guidance can not allow students to systematically acquire the knowledge, and to a large extent also increase the learning burden of some students. Therefore, the inadequacy of the teaching model itself will also affect the actual teaching and learning, which needs to be improved in the operation of the teaching model in terms of adaptability and scope of application.

### **3 Comparison of cross-cutting educational approaches**

#### **3.1 Traditional medical education model**

The traditional medical education model is still used on a large scale as the most common means of education. As a large offline classroom system, it can effectively solve the problems of fewer teachers and more students, and the difficulty of coordinating teaching information. Given the current imbalance in the ratio of students to teachers in China, it is unlikely that the traditional education model can be transformed quickly <sup>[7]</sup>. However, the relationship between teachers and students in large classes is fragmented, often leaving the teacher "on his own" to talk about basic theoretical knowledge and students to passively grasp it. In addition, traditional offline education emphasises theory rather than practice, while actual medical practice is subject to many contingencies that require medical practitioners to have the ability to identify and solve problems in a timely manner, an ability that medical students lack under the traditional teaching model. It has also been proposed that the above problems can be well solved by using the traditional teaching model as a carrier and integrating PBL, CBL and other educational methods into it <sup>[8]</sup>. However, fundamentally, PBL and CBL cannot be fully integrated with traditional medical teaching mode.

#### **3.2 MOOC Online Education**

MOOC online education courses are rich in resources, complete in variety, repeatable, and not limited by time or geographical location. In the MOOC education platform, teachers do not have to repeat basic medical knowledge over and over again, and the time saved can be used to make up for the lack of humanities education for our medical students <sup>[9]</sup>. As they are not severely limited by classroom time, teachers are able to select the corresponding focus for their analysis, thus effectively integrating the available teaching resources in a variety of format. It can also be combined with Internet technology to show relevant videos and PPTs, which facilitates further integration of teaching methods such as PBL and CBL. For medical students, the freedom of learning is greater, allowing them to spend their time more efficiently and flexibly, and the resources on the Internet are more conducive to learning medical cases and understanding the frontiers of medical and biological knowledge. However, because of the freedom of the MOOC format, its disadvantages are also obvious. With its focus on

learning on an online platform, it also fails to compensate for the lack of practical education in traditional medical education <sup>[10]</sup>. MOOC online education does provide a platform for the small class size required by PBL and CBL, and meets the stringent requirements of PBL and CBL for classroom time, however, MOOC lacks interaction between teachers and students in a geographically realistic environment, and PBL and CBL teaching based on cases or problems lack role-playing in real-life scenarios, relying only on the real effect of PBL and CBL is greatly reduced by the lack of concrete details such as consultation, room visits and documentation of clinical cases discussed on paper.

### 3.3 SPOC Online Education

SPOC education is a small-scale restricted online course. The SPOC education model has the following advantages in the new era of medical education.

(i) Close integration with teaching methods such as PBL, TBL and CBL: soc education has had a natural advantage since its inception because of its private and restrictive teaching characteristics and ease of teaching in small classes, which coincides with the philosophy of PBL, TBL and CBL. While PBL and CBL teaching methods are based on questions and cases to elicit learning objectives, SPOC uses advanced multimedia technology to have SPOC, on the other hand, uses advanced multimedia technology to target clinical cases in the classroom and uses multi-sensory technology such as audio-visual to immerse students in the situation and facilitate good role-playing <sup>[11]</sup>. Take the clinical early apprenticeship system as an example, by explaining real world cases, interspersed with common emergencies in the medical process, and equipping each group with a professional and experienced apprentice teacher, teaching methods such as PBL and CBL give full play to the advantages of teaching efficiency and deep learning impressions.

(ii) The SPOC teaching model provides a good platform for these education modes. In the relatively private educational environment of the SPOC, medical students are willing to confide in their teachers about the various confusions they have about the medical profession in the course of their studies, and medical teachers are more likely to provide one-to-one guidance in private and "transmit" their own rich clinical experience and medical ethics to their students, completing the "baton" of those who are engaged in the medical career. The teacher can upload pictures, videos, examples of exercises, PPTs and other online resources to give targeted guidance, and students can ping the teacher to solve their unique problems.

(iii) Motivating students to learn on their own: the future of medical education is more focused on a multiple model, with a gradual transition from the former teacher-led to student-led teaching format. In the SPOC education process, the teacher no longer conveys the complete curriculum, the course is fragmented and the boundaries between apprenticeship, learning theory, analysing cases and anatomical operations are no longer so clear, these are just means to achieve educational objectives through the rotation of clinical teaching cases <sup>[12]</sup>. Students are forced to participate in discussions, actively learn more from the network and from their teachers, and are constantly engaged and fed back in the learning process, thus stimulating a thirst for knowledge,

recognising professional self-discipline and developing altruism. In switching between different clinical cases, students are made aware of various medical specialties, which contributes to the development of their medical career speciality planning skills.

## 4 Conclusion

With the innovation of educational tools and the development of science and technology, the future of medical education is not necessarily still two-dimensional, but may be a more multidimensional teaching system, such as the recently popular virtual reality technology, which may also be integrated with PBL and SPOC education models in the future to form a three-dimensional medical education system. Therefore, the optimal medicine education model must not be fixed and still needs to be tirelessly explored by subsequent scholars.

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