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Research on the Implementation Path of Integrating MOOC and Blended Learning in Oncology Education

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Abstract: Oncology covers a wide range of knowledge and is more difficult compared to other clinical disciplines. Therefore, it is crucial to seek an efficient teaching method for oncology education. In recent years, China's internet technology has achieved rapid development. Massive Open Online Course (MOOC), a blended learning approach based on internet technology, has strong applicability to medical education. It can not only improve teaching quality but also promote further reform of the discipline. Based on this, our study searched for relevant research at home and abroad and reviewed the implementation path of integrating MOOC and blended learning in oncology education. This provides a theoretical foundation for the innovation of oncology teaching models, improves the level of oncology teaching, and lays a solid foundation for talent reserves in oncology departments.

Keywords: Massive open online course; Blended learning; Oncology teaching; Implementation path; Research progress

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1. Introduction

With the rapid development of society and the continuous replacement of times, China's requirements for oncology education are getting higher. As an independent discipline with strong professionalism and complex pathogenesis, oncology has high requirements for a comprehensive understanding of diseases [1]. Moreover, in recent years, many oncology-related marginal disciplines have emerged, which has also increased the difficulty of oncology teaching to some extent. Since the application of internet technology to medical teaching, significant changes have occurred in teaching models, gradually shifting from teacher-led to student-led. Supported by various open online courses, Massive Open Online Courses (MOOCs) have emerged. This model can effectively cultivate students' independent learning abilities, thus solving the difficult problems in oncology teaching [2]. Based on this, our study reviewed the implementation path of integrating MOOC and blended learning in oncology education. Firstly, we analyzed the current teaching situation of oncology and reviewed the development of MOOC blended learning. Finally, we explored the implementation path of integrating

MOOC and blended learning in oncology education.

2. Analysis of the current situation and development of oncology teaching

2.1. Current situation of oncology teaching

As a clinically common disease, cancer poses a significant threat to patients' physical and mental health due to its complexity and difficulty in treatment. With the increasing aging of the population in China and severe environmental pollution, the prevalence of cancer is continuously rising. Relevant research [3] directly points out that over 14 million people are diagnosed with cancer every year, making it a leading cause of human death. Early diagnosis and prompt treatment are crucial. In this context, it is essential to have a group of highly qualified oncology talents. Oncology involves a wide range of knowledge and complex content, including basic knowledge of pathology, physiology, biochemistry, immunology, and clinical operations. Based on different tumor types, cancers can be classified as gastric cancer, intestinal cancer, lung cancer, liver cancer, and cervical cancer. Therefore, learning oncology well is crucial, and it places higher demands on medical students. It is necessary to strengthen students' skill training to improve their professional level. Teachers should also update their teaching philosophy to enhance teaching quality and improve students' learning effectiveness [4]. Although oncology teaching has developed for a long time, as a practical and interdisciplinary subject, both teaching and learning difficulties are relatively high. Clinical application requires high operational ability and theoretical knowledge from students. Therefore, effective teaching methods are crucial for medical students to improve their learning effectiveness. Relevant studies have shown that efficient teaching methods can effectively increase medical students' enthusiasm for learning and enhance their understanding.

2.2. Development of oncology teaching

Currently, oncology teaching mainly focuses on mastering disease pathogenesis, etiology, diagnosis, and treatment. Traditional teaching methods are relatively monotonous, with boring course content. They emphasize theoretical knowledge while lacking practical operation teaching, making it difficult to stimulate students' subjective initiative. Additionally, in traditional teaching, case resources are limited, resulting in low interest in teaching content and poor teaching effectiveness. Furthermore, research indicates significant differences in learning abilities among students, and traditional teaching methods cannot cater to every student, compromising teaching effectiveness [5]. In terms of evaluation, traditional teaching mainly relies on written tests, which are relatively one-dimensional and do not focus on the learning process, hindering the improvement of students' comprehensive abilities. In recent years, with continuous industrial reforms, relevant education departments have proposed corresponding measures to reform medical education models and cultivate new medical talents. Curriculum, as the core of teaching, is crucial for teaching activities and is designed based on students' needs.

3. Analysis of the development of hybrid teaching in MOOCs

Massive Open Online Courses are open courses that originated with Western professors uploading their lectures to online platforms [6]. Many people learn on these platforms, forming a large, open online course community. This type of platform entered China in 2012, aligning perfectly with the development of the information age in our country and meeting the diverse learning needs of many learners. Under this teaching

model, the platform collaborates with renowned teachers to develop corresponding courses. For different knowledge points, there are 8–15 minutes of teaching videos combined with homework and online quizzes, open to learners on the platform. Unlike other online teaching platforms, MOOCs are open and free to everyone, offering a high degree of freedom. The teachers on the platform are generally well-known and highly qualified, ensuring the quality of the course content. Additionally, MOOCs exhibit the characteristics of micro-courses, with a strong systematic approach that breaks the limitations of traditional teaching, ensuring the sharing of high-quality teaching resources, enriching learning content, and accelerating classroom reform. MOOCs have revolutionized teaching and Internet technology, playing a significant role in meeting the training requirements of high-quality medical talents.

In recent years, MOOCs have become increasingly sophisticated, giving rise to hybrid teaching methods based on MOOCs. Some scholars define it as a fusion of on-campus learning and large open online courses, cleverly combining online and offline teaching [7], and integrating traditional teaching resources with online teaching resources. This represents a more comprehensive teaching method in the information age. Under this teaching model, medical students studying oncology have more flexible study time and can access quality learning resources. The development of MOOCs has undergone a paradigm shift from connectivism (cMOOC) to behaviorism (xMOOC). Early cMOOCs emphasized the networking of knowledge, but due to unmet expectations in teaching effectiveness, they did not gain widespread recognition. On the other hand, xMOOCs, with their structured content aligning with traditional learning habits, have become mainstream. However, the format of MOOCs remains relatively uniform, making it difficult to meet the needs of deep learning. The combination of MOOCs and hybrid teaching is an inevitable choice for the informatization reform of higher education. Through technological empowerment and teaching innovation, this model effectively breaks the temporal and spatial limitations of traditional classrooms and addresses the lack of interaction in MOOCs, providing a new path for cultivating innovative talents. Nevertheless, sustainable development still needs to overcome practical challenges such as technology adaptation and teacher capacity building. Future research should focus on establishing long-term mechanisms for hybrid teaching, promoting the dual goals of educational equity and quality improvement.

4. Application of the integration of MOOC and blended learning in oncology education

4.1. Application of MOOC in oncology education

MOOC platforms can provide high-quality teaching resources for oncology education, mainly involving case analysis, teaching videos, academic lectures, etc. This can not only compensate for the uneven quality of teachers in traditional teaching but also effectively solve the problem of limited teaching resources, providing students with better learning conditions. Studies have pointed out that MOOCs have good openness and freedom, allowing students to learn according to their own time and effectively improving their autonomous learning abilities. In addition, MOOC platforms also feature discussion areas and Q&A sections, providing students with opportunities for communication and promoting resource sharing. Some studies have combined the MOOC teaching model with traditional teaching, effectively integrating online and offline teaching to impart basic knowledge, while offline classrooms can focus on analyzing difficult problems, further improving teaching effectiveness. However, in the MOOC teaching model, oncology also faces certain challenges. MOOCs require a stable network environment and advanced equipment support. In some remote areas, there may be issues such as unstable networks and incomplete equipment, which have a significant

impact on the application of MOOCs. Based on the differences in students' autonomous learning abilities, some students may not be able to adapt to the MOOC autonomous learning model. Therefore, effective incentives must be provided to better utilize MOOC resources.

4.2. Integration of MOOC and blended learning in oncology education

The teaching model that integrates MOOC and blended learning requires dividing the teaching phase into pre-face-to-face online learning, face-to-face teaching, post-face-to-face online learning, and staged testing. Pre-face-to-face online learning involves completing online learning on the MOOC platform before formal instruction begins. In face-to-face teaching, teachers conduct classroom instruction online and discuss difficult points encountered during the learning process. Post-face-to-face online learning involves students engaging in extended learning on the MOOC platform after the course ends. Staged testing allows for a timely understanding of students' learning progress and adjustment of teaching strategies. A study compared the teaching effectiveness of the integrated MOOC and blended learning model with traditional teaching using undergraduate students as the research subjects. The results showed that the integrated MOOC and blended learning model can effectively improve students' average exam scores. Moreover, the MOOC and blended learning model has significant advantages in enhancing students' learning enthusiasm and initiative, as well as improving learning efficiency and effectiveness. Other studies [8] have also pointed out that the integration of MOOC and blended learning can boost students' learning enthusiasm and initiative, enhancing their mastery of knowledge and learning efficiency.

5. Conclusion

Through a systematic review and analysis of relevant literature on the implementation pathway of integrating MOOC and blended learning in oncology education, it becomes clear that this integrated model brings many changes and opportunities to oncology education. By combining the advantages of MOOCs, such as large scale, openness, and resource richness, with the blended learning concept, an innovative model of online and offline deep collaboration is constructed for oncology teaching. This effectively compensates for the limitations of traditional teaching models in terms of resources, time, and space. This model is expected to play a greater role in oncology talent cultivation, pushing oncology education to new heights and laying a solid foundation for cultivating more excellent oncology professionals.

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Disclosure statement

The authors declare no conflict of interest.

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