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The Supplement and Promotion of Online Course for Histology and Embryology Teaching

Huijie YUAN,^{1,2} Yonghong ZHU,³ Ying DING,³ Wei ZHAO,³ Chaohong LI,³ Hongbo ZHANG,³ Jichang WANG,³ Xi SUN,³ Shuying LIU,³ and Lina QIN^{*,1,4}

¹Faculty of Forensic Medicine, Zhongshan School of Medicine, Sun Yat-sen University Guangzhou 510080PR China

²Teaching and Experiment Center, Zhongshan School of Medicine, Sun Yat-sen University Guangzhou 510080, PR China

³Department of Histology and embryology, Zhongshan School of Medicine, Sun Yat-sen University, Guangzhou 510080, PR China

⁴Guangdong Province Translational Forensic Medicine Engineering Technology Research Center, Sun Yat-sen University, Guangzhou 510080, PR China

*Corresponding author. Email: qinlna@mail.sysu.edu.cn

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Abstract

Since the emergence of the novel coronavirus epidemic, online teaching has begun to be widely carried out in various universities, and has been widely recognized by teachers and students. This article discusses the online teaching method of histology and embryology in Zhongshan Medical College of Sun Yat-sen University, analyzes the advantages and disadvantages of online teaching, and proposes improvement measures for online teaching in order to provide reference for better online teaching in universities.

Keywords: Self-efficacy; COVID-19; Awake prone positioning; Clinical study

Since entering the 21st century, information science and technology has been developing rapidly with unstoppable momentum, affecting all aspects of social life, while also gradually penetrating into the field of education and ascending into the teaching classroom. Traditional offline teaching alone can no longer meet the needs of education and the rapid development of medical science and technology[1]. Online courses, as newborn information technology products, are the protagonists of online open courses, which are provided relying on teaching systems such as public course service platforms like wisdom tree, learning pass, rain classroom, etc., along with computer-aided exercises and quizzes for students to review and consolidate knowledge. Because of its rich content, the ability to overcome the limitations

of time and space to learn anytime and anywhere, and the convenience of teacher-student communication[2,3], it has triggered a new change in educational philosophy in the field of higher education.

Histology and embryology is a very important professional basic course in medicine, specializing in the study of the normal structure and function of the human body, requiring students to master the basic concepts, tissue morphology and function of the course[4,5]. The course of histology and embryology is also characterized by strong theory, close integration with practice, boring and abstract content, which requires students to think and practice by heart on the basis of knowledge[6]. Therefore, it is very important to adopt modern teaching technology, combine with traditional teaching methods, integrate the learning of online courses, mobilize students' learning enthusiasm and stimulate their interest in learning histology and embryology. Through in-depth discussion on the construction of online courses in our university, this paper analyzes and summarizes the advantages and disadvantages in the construction and application of online resources for histology and embryology courses, aiming at improving the level of higher medical education and also accumulating valuable experiences for the development of online and offline blended teaching.

1. Content of online course construction

1.1 Establish a complete and feasible online open course system for histology and embryology, and promote our online open course system driven by histology and embryology to be consistent with the national online open course education system, and the online courses are to be consistent with the development direction of education and talent training needs of medical college. 1.2 Create a model online course system of histology and embryology in Guangdong Province, "Based on Guangdong, facing the whole country"; the online course system of morphology will be promoted and used in the relevant majors in our university, and we try to create a high-level model online course system of medical majors in Guangdong Province.

2. Online course planning and implementation

2.1 Selection of online course resources and platforms

There are two general types of teaching methods for histology and embryology through the network: live and recorded[7]. Live teaching means classroom theoretical teaching is conducted through live teaching, which requires students to take classroom notes while the teacher is explaining the teaching content, and to post questions in real time through the classroom discussion boards in the live software, and the teachers can answer questions at any time[8]. However, live teaching requires too much network speed and stability, which is prone to failure and difficult to solve in time. In order to ensure the smooth completion of the course, online teaching generally adopts recording online teaching videos to meet the teaching needs. At the time of building the course, in view of the requirements of online courses to be launched in a short time, we chose the Wisdom Tree online teaching platform after initial screening with the assistance of the university. Once the course was online, the platform provided a variety of convenient online communication methods, and a series of

teaching-related functions such as student check-in, data recording, homework assignment, and exams, etc. At the same time, we also set up course QQ groups and WeChat groups as supplementary forms of online teaching. For one thing, it is convenient for students to communicate with each other in a more timely manner when problems arise in online learning. For another, teachers can assign and correct homework for students through the "homework" column in QQ groups. The two forms complement each other in order to make everything in order.

2.2 Implementation of online course

After the semester begins, the teachers of histology and embryology organize students to study online according to the curriculum of the semester, and teachers are online at the same time to exchange feedback in time to help students master and consolidate their knowledge to the greatest extent. Students can log in to the Wisdom Tree platform (www.zhihuishu.com) with basic information (the account number is the student number or the bound mobile number) to watch the shared online course. Data can be viewed and analyzed in two ways (mobile and web) from the teacher's side, so as to achieve the goal of using information technology to help teaching activities, and make the traditional teaching content informatized and digitalized. Students can also use the "Know to" app or the computer browser to carry out mobile learning of the course, which is not limited by time and space and is very convenient. In addition, they can also carry out interactive learning through the platform interaction module to improve learning efficiency. After students complete the corresponding learning nodes, the online learning will be recorded as part of the final grade. At the end of the 18-week course with a total of 30 credit hours, all classes will complete the contents of the histology and embryology course, and the platform conducts a unified online quiz.

2.3 Outcomes of the online course

2.3.1 2.3.1 Number of course selection

After the exploration and promotion of eight semesters, the number of learners has improved in five dimensions, the number of cross-campus shared course-using schools has accumulated from 1 in the first semester (Autumn semester 2019) to 25 so far (Spring semester 2022), the number of course selections has reached 12100 so far (cross-campus shared courses + open courses), of which the number of cross-campus shared courses has increased significantly, realizing the change from interest courses to credit courses.

2.3.2 Significant improvement in interaction

After eight semesters of operation, the interaction has achieved a qualitative improvement. From 94 interactions in the first semester to 436 interactions in the second semester, the number of interactions has reached 6911 so far, with a significant increase in growth rate.

2.3.3 Course completion

As of the submission date, the number of course users had reached 12100, and the enrollment rate had reached 99.9

2.3.4 Results comparison

Up to now, about 11000 people have participated in the test and passed the course examination in 25 schools that have selected courses. Taking our school as an example, after the introduction of online teaching in 2018, the students' experimental scores and final overall evaluation scores are significantly better than traditional teaching, which shows that online teaching is a good supplement to offline teaching and is conducive to the improvement of students' comprehensive scores.

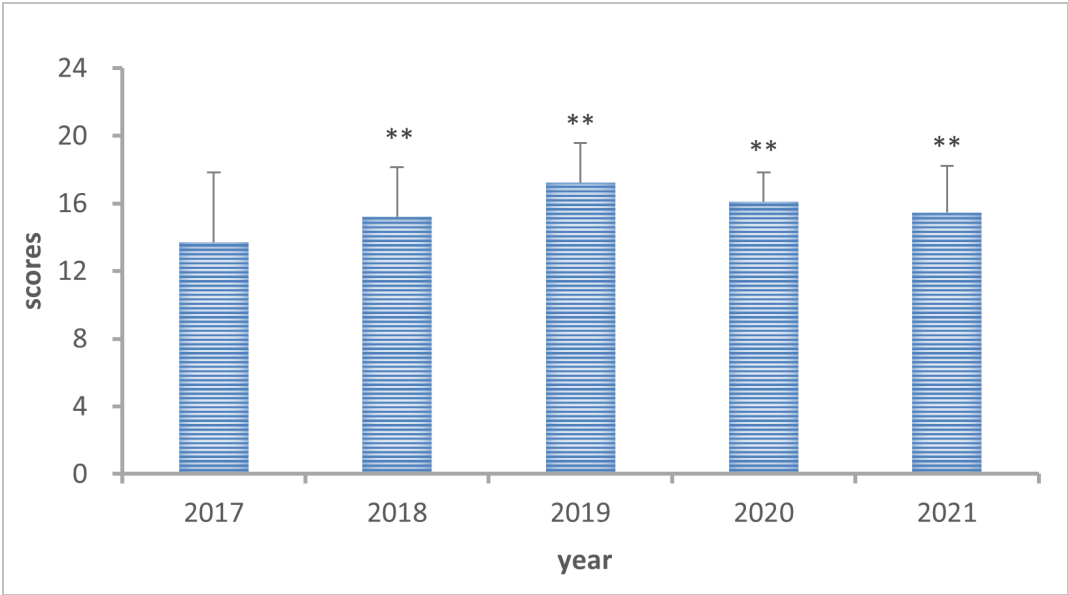


Figure 1. Comparison of students' experimental results after the introduction of online teaching Note: compared with that before the introduction of online teaching in 2017: **P<0.01

2.3.5 Basic skills

Students' basic skills are more solid: Sun Yat-sen University holds an annual laboratory skills competition for third-year medical undergraduates, which includes experimental examinations of morphology (histology and embryology, anatomy and pathology) and functional science (physiology and biochemistry). Histology and embryology is mainly based on observation of sections. The analysis of the exam shows that 30% of the students get all 10 slices correct and 60% get more than 8 slices correct. The students get such good results even after 3 years of studying histology and embryology, which shows their knowledge of histology and embryology is very solid[6] .

3. Discussion

3.1 Advantages of online courses

3.1.1 Enrich the contents of higher medical education

If students only learn the knowledge arranged by the school, they may not be able to achieve the requirement of "Mastering the solid basic theory and broad professional knowledge of a

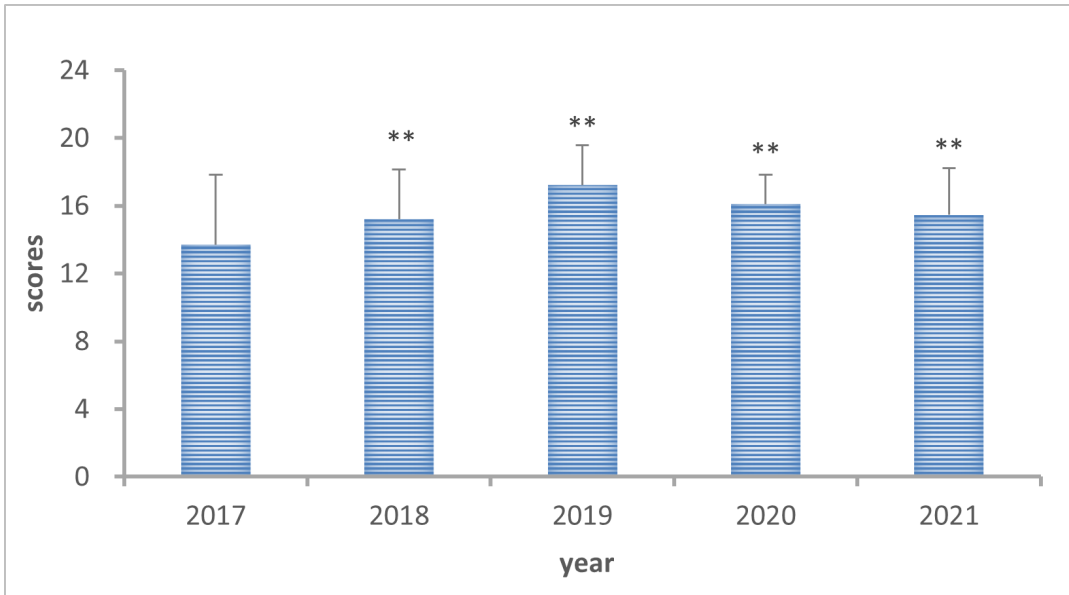


Figure 2. Comparison of students' final theoretical scores after the introduction of online teaching Note: compared with that before the introduction of online teaching in 2017: ** $P < 0.01$

certain specialty or career field", so it is necessary for medical students to acquire knowledge by other means, and online course platforms are undoubtedly a good choice. It can be seen from the introduction of online course platforms such as Udacity, Coursera, Xue Tang Online, Good University Online, etc., which have a large number of resources, with rich course types, diversified language types, comprehensive coverage of subjects, covering almost all disciplines. High-quality resources are open and freely shared online, and students can independently choose courses in various fields according to their personal conditions. Many well-known universities at home and abroad participate in the construction of online courses, first-class universities producing and developing high-quality resources with the joint support of famous universities such as Massachusetts Institute of technology and Harvard University abroad, Tsinghua University, Peking University and Fudan University in China. General types of schools can improve the teaching quality and narrow the level difference between schools and disciplines through the resource sharing platform. No matter which platform, because of its rich number of courses, it can meet the needs of students with different majors and interests.

3.1.2 3.1.2 Diversification of teaching methods in the medical specialty

In traditional medical education, the main channel for medical students to acquire knowledge is the school classroom. In the theoretical course learning, the teacher gives priority to teaching in the classroom, and the students' learning mode is "classroom learning and review after class"; therefore, traditional offline teaching is inevitably limited by time and place. The introduction of online courses overcomes these limitations. Online courses adopt the mode of separation of time and space between teachers' teaching and students' learning, and

learners can participate in learning with the assistance of information technology such as cell phones and computers. Intelligent devices provide a virtual teaching environment, breaking the original fence boundary of traditional schools. With the characteristics of "anyone, any time, any place", online courses provide a new education mode for the reform of medical higher education, which belongs to the learning mode of "learning before class, discussing in class and reviewing after class". Moreover, online course teaching belongs to team teaching. In terms of learning resources, medical students can fully enjoy advanced and high-quality educational resources. Through the discussion area, students can deepen their understanding of knowledge in the communication with experts. This is a team communication between students to help realize the internalization of knowledge. In terms of the teaching process, the introduction of online courses as a new mean is conducive to developing new forms of undergraduate teaching and improving the teaching system. Students can choose what they need among many online courses, and they can also choose teachers whose teaching methods are suitable for them, which fully respects the learning freedom of learners. Students can take the initiative to study effectively, and it is convenient for learners to arrange their study time independently. Generally speaking, most undergraduate students have strong self-learning ability and self-discipline, so online course teaching is suitable for medical students to study independently.

3.1.3 Make up for the lack of professional teachers

The core concept of online course education is the sharing of educational resources. The sharing of medical undergraduate education resources is to realize the common utilization of educational resources within colleges and universities, between schools or between schools and society, to reduce the input of people and equipment, and to optimize the utilization of resources. "The Action Plan for Revitalization of Education in the 21st Century" points out that we should strengthen the implementation of "modern distance education project", form an open education system, setting up high-quality online courses on the Internet platform taught by famous teachers. Medical undergraduate education can share resources through the online course platform, which can alleviate the shortage and weakness of teachers to a great extent. The Internet provides students with a huge amount of learning resources, students and teachers obtain information and knowledge almost simultaneously, and educational resources are shared across time and space through open education networks, students having more and more choices in learning content. The status and role of both teaching and learning have changed, and students no longer have to be limited to the inherent courses provided by the school. In online course teaching, students are active learners who internalize knowledge, and high-quality resources are no longer the exclusive preserve of students in top universities. In the case of shortage of educational resources, it has made up the deficiency of educational resources in China to a certain extent, releasing part of the teachers' faculties to meet the learning needs of talents at all levels of society. Nowadays, with the prevalence of online course platforms, high-quality educational resources at home and abroad can be reasonably introduced in accordance with the law. Medical students in ordinary schools can also learn high-quality courses from first-class universities, breaking the knowledge barrier and educational gap between different schools and disciplines, solving

the problem of shortage of teachers' resources in universities, and promoting the fairness in higher education.

3.1.4 Give students more free time and space to learn

Due to the limitations of the class hours and contents of offline courses, teachers need to teach the knowledge points in one class to a large number of students in a relatively short period of time. The content of histology and embryology is abstract and complicated, and students will miss important knowledge points if they are not careful. Take the study of epithelial tissues as an example, students need to complete the study of the structure and function of coated epithelium, glandular epithelium and glands, as well as various epithelia within two class hours, which is a challenge for many students. Online learning allows students to control the time, progress and rhythm of learning, and choose to study efficiently during periods with focused attention. At the same time, students can also play back unlimited times with the help of high-quality teaching videos online to consolidate the achievements of learning. This is in line with the student-centered education concept, which helps to cultivate students' subjective initiative and autonomous learning ability.

3.2 Deficiencies of online courses

Although online teaching has many advantages, online courses cannot completely replace offline courses. The learning effect of online courses depends on the independent learning ability of students. The course of histology and embryology is offered in the first year of college, and students at this stage have just entered the university and have not yet completely broken away from the state of passive learning in high school. In the absence of effective supervision, it is difficult for students to effectively control themselves. Besides, online learning requires the support of platform and network, and if the platform fails or the network is congested during the learning process, the learning effect is bound to be greatly reduced.

3.3 Reflection and outlook

In the final analysis, the foothold of teaching and educating people is always the relationship between people. Online courses have indeed brought a lot of convenience to the development of our teaching and the improvement of teaching effect. However, the real communication and interaction between teachers and students in the same time and space cannot be replaced by the cold network. The blended teaching of online and offline benign combination is the development direction of histology and embryology teaching. Rich online learning resources can broaden the scope of teaching, offline teachers' detailed explanation and face-to-face communication between teachers and students can expand the depth of teaching. The advantages of both complement each other to better serve the teaching[9].

Looking forward to the future, with the increasing abundance of digital resources, in order to achieve a powerful nation of education, we should work in six aspects based on the present: (1) Reshape the objectives of the curriculum cluster with the concept as the guide; (2) Innovate the content of the curriculum cluster with the teacher as the leader; (3) Innovate the teaching and learning of the blended curriculum with the students as the

center; (4) Cultivate a high-level curriculum team with the goal of excellence; (5) Innovate the mechanism of curriculum construction with the method of common construction; (6) Take certification as the starting point to ensure the quality of curriculum construction. Let's work together to realize China's dream of becoming a powerful country in higher education as soon as possible!

Fund

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