

Experience in the application of microlecture in the experimental teaching of clinicopathological examination technology

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Abstract: Microlecture video was taken as the preview resources. The blended teaching model was adapted to complete experimental teaching of Clinicopathological Examination Technology curriculum. The teaching effect of the observation class and the control class was tested by the works score and the self evaluation of the technical mastery degree. The results show that in the observation class, the works score was significantly higher than the control class, and the degree of technical mastery was significantly higher than that of the control class. The teaching effect of experimental class is improved by using the blended teaching method that based microlecture. The use of microlectures improves the teaching effect of the experiment course. Clinicopathological Examination Technology is a course with operating technology as the main content. In experimental teaching, complex operation technology is a key point of teaching as well as a difficult point. How to enable students to master the correct operation technology in a limited time is an urgent problem. With the popularization of smart phones and WIFI, how to make use of information technology and environment to better serve teaching is also a problem faced by information-based campus.

A microlecture refers to the organic integration of teaching activities around a certain point of knowledge (key, difficult and doubtful points) with video as the carrier according to the requirements of curriculum standards and teaching practice (Jianli Jiao, 2011). As a brand-new teaching resource, microlectures have created the individualized learning conditions for students with their outstanding themes, various forms, shortness and concision, and easiness to watch. It is an important supplement and expansion of traditional classroom teaching (Shumei Zhuang, 2016).

This study explores the application of microlecture in Clinicopathological Examination Technology teaching of medical laboratory technology specialty, and provides a basis for the extensive implementation of microlecture as the carrier of experimental teaching in the future.

1. Object and methods

1.1 Object

2 second-year natural classes of medical laboratory technology major in a higher vocational college were taken as the objects and divided into an observation class of 40 students and a control class of 44 students.

1.2 Methods

1.2.1 Selection of On-Line Instructional Platform

Blue Moyun Class, a free instructional software for mobile phones, is used as the on-line instructional platform. It integrates online teaching and learning and provides online learning, testing, homework, teacher-student interaction, resource sharing and other functions (Qiong Wu, Guanghong Zhao, Huan Yang, 2016).

1.2.2 Design and Production of Microlectures

A microlecture is not a miniaturized course, but a resource that can help students learn (Tonghai

Hu, Ying Wang, 2011). In the design, the microlecture is positioned as a "learning resource". Considering the experimental psychology and experimental habits of the students, the students' interest and thinking in experimental learning can be stimulated and the effectiveness of experimental learning can be improved through various strategies such as problem orientation, task driving and activity design (Tiesheng Hu, Mingyan Huang, Min Li, 2013).

The production of the series of microlectures of Clinicopathological Examination Technology aims at training applied skilled personnel, improving students' practical ability as the main line, improving students' professional quality as the core, and integrating practice into teaching. The teaching design of microlecture includes the analysis of learning situation, the determination of teaching objectives, the selection of teaching content, the analysis of teaching emphasis and difficulty, the design of teaching procedures, teaching evaluation and other links (Zengyan Yuan, Xiaofeng Song, Junli Zhang, 2015). The Practical Clinicopathological Examination Technology edited by Xiaoru Wang, published by Tianjin Science and Technology Publishing House, was used as a reference material. According to the requirements of the syllabus, the Affiliated Hospital was taken as the platform to take pictures about the common clinicopathological examination technology. In order to combine closely with clinical practice and cultivate students' professional quality, the working situation was created in the form of animation, and real case data was introduced.

1.2.3 Teaching Mode and Design of Teaching Methods

A blended teaching model that combines traditional teaching features with online learning to provide students with personalized and differentiated teaching is used. There are online learning and face-to-face guidance and supervision for students in the blended teaching model so as to maximize the efficiency of teaching (Lihua Xu, Bing Li, Yong Zhang, 2016). The blended teaching model is conducive to deep learning (Ronghuai Huang, Ding Ma, Lanqin Zheng, 2009). Shallow learning only focuses on the memory of information, and can only be an inefficient learning. Deep learning emphasizes the understanding of new knowledge, so that new knowledge and individual knowledge coupled into the existing knowledge framework, including the learner's understanding process, is a problem-solving learning.

Task driven teaching method is based on constructivist teaching theory. In the whole process of teaching, it centers on a number of specific tasks. In the process of completing the tasks, learning basic knowledge and skills, it cultivates students' comprehensive ability to ask questions, analyze problems and solve problems, and emphasizes that students should carry out learning activities in an autonomous and cooperative environment driven by tasks in real situations.(Xiaoe Huang, Junxiang Liu, Qing Tan, 2014).

A blended teaching model was adopted in the observation class, while the traditional teaching model was adopted in the control class. In the observation class, the students were given microlecture video and courseware as preview resources before class. After assigning tasks in class, the teachers instructed the students to practice the operation techniques in groups. The questions could be answered by means of group discussion, revision of microlecture videos, and consulting teachers. The pre-class preview resources of the control class were courseware. After assigning tasks in class, the teacher supervised and instructed the students to practice in small groups. When they met with problems, they could consult the teacher and discussed in small groups. Both classes could continue to practice their operation techniques under the guidance of microlecture videos in the open laboratory after class.

1.2.4 Design of Teaching Process

The teaching process of the observation class is as follows: ① The teacher uploads teaching resources, including microlecture video and courseware, 2 days before class. Students are notified to study according to the guidance of preview outline and finish the homework. At the same time, the teacher creates a Q&A activity to help and guide the problems encountered during the student preparation. ② In the experimental class, the teacher first introduces the activities, including explaining the purpose of the experiment, the experimental materials, the experimental steps, and

then teaches. Then the tasks are formulated and assigned to each group in the form of task sheets. When students encounter problems, they can study on-line independently under the network environment, and they can also conduct collaborative discussions in groups. Teachers arrange necessary classroom teaching according to the actual situation to ensure the smooth progress of learning activities (Ronghuai Huang, Ding Ma, Lanqin Zheng, 2009). ③ Evaluation and sharing: Students show their work results to teachers and peers, and construct knowledge again in the process of reporting learning results, accepting evaluation and participating in discussions, so that knowledge can be consolidated and sublimated. ④ The lab is open after class. Students continue to practice unskilled operations under the guidance of microlecture videos (Ronghuai Huang, Ding Ma, Lanqin Zheng, 2009).

The teaching process of the control class is as follows: ① 2 days before the class, the teacher uploads the courseware as a preparation resource, and the students combine the teaching materials for the preparation. ② In the classroom, the teacher explains the purpose of the experiment, the experimental materials, and the experimental steps, then teaches, and then issues the task sheets, and the students complete the tasks specified in groups. The teacher supervises and guides and finds problems in time. ③ After the task is completed, the student presents the work and the teacher evaluates it. ④ The lab is open after class. Students continue to practice unskilled operations under the guidance of microlecture videos.

1.3 Test of Learning Effect

There are two ways to evaluate the teaching effect of the experiment class: objective rating by the teacher and self evaluation by the student. The former is achieved by the teacher's scoring the items submitted by the students according to the section scoring standard, and finally giving the total score, with a perfect score of 100 points. The latter is done by the students' evaluating themselves according to three levels of mastery (proficient, unskillful, incapable) according to the five operating techniques (installing wax blocks, moving tool holders, adjusting wax blocks, cutting wax blocks, serial section) given in the task sheet.

At the end of the experiment, each student submits a pathological section as the work for scoring by the teacher. The scoring criteria are shown in Table 1.

Table 1: Experimental scoring standard.

S/N	Items	Full marks
1	Is it a single section?	10
2	Position of tissue	10
3	Is the tissue complete?	10
4	Is there any longitudinal crack	10
5	Is there any ruffle?	10
6	Is there any scratch?	10
7	Is there any scratch?	10
8	Thickness of tissue	10
9	Is there any breakage?	10
10	Is there any contamination?	10

1.4 Statistical Analysis

Using SPSS 21.0 statistical software, the average score was compared using two independent sample t-tests, the scores were compared using Mann-Whitney U test, and the degree of operational technology was compared by χ^2 test. $P < 0.05$ showed a significant difference.

2. Results

2.1 Section Scoring

Statistical analysis of the section scoring showed that the average scores of the two classes were

significantly different, $P = 0.000$, and the observation class was significantly higher than the control class. From 60 to 80 scores, the observation class was significantly higher than the control class, $P=0.000$. From 85 to 90 scores, the observation class was higher than the control class, but the difference was not significant, $P=0.825$. Six students failed in the control class, and there was no failure in the observation class (Table 2).

Table 2: Scoring analysis of section works.

Score section	Control class (n=44)	Observation class (n=40)	Value of P
<60	6(13.6)	0	
60-80	34(77.2)	31(77.5)	0.000
85-90	4(9)	9(22.5)	0.825
Average score	67.5	77.1	0.000

2.2 Self-Evaluation of Mastery Degree

The degree of mastery of serial section in observation class was obviously better than that in control class, and there was no significant difference in mastery of other operation techniques between the two classes, which showed that microlecture video played an important role in improving the students' mastery of the final section technology (Table 3, Fig. 1).

Serial section is the most complicated step in the section process, and it is also a key link, which is difficult to operate. Microlecture video can be transmitted and played on-line because of its visual presentation of complex operation process, which makes it easy for students to observe repeatedly and master operation techniques comprehensively. The blended teaching model based on microlectures improves the teaching effect of the experimental class.

3. Discussions

In this study, it is found that microlecture video as a new teaching resource improves the teaching and learning methods of experimental courses. The blended teaching model based on microlectures improves the teaching effect of the experimental class. It can be applied before, during and after the experimental teaching, which is convenient for students to learn complex operation techniques outside the classroom and is beneficial to the development of blended teaching mode. The microlectures show the experimental process for the students before the class, assist the teachers to carry out the experimental teaching until the students succeed in the experiment and master all the knowledge points during the class, and help the students to review the links that have not been mastered in the class until they learn after the class. In this study, it is found that the blended teaching mode with microlectures as teaching resources has the following advantages.

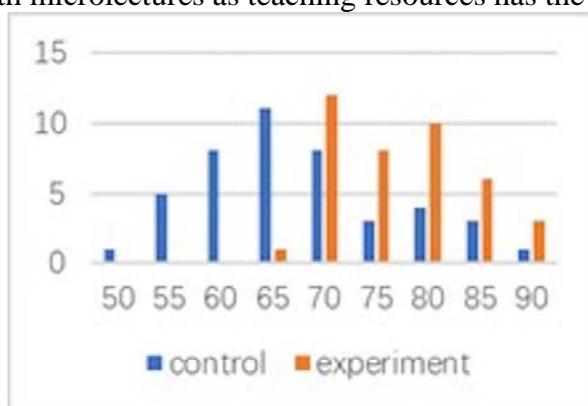


Figure 1: Score of section in observation class and control class.

3.1 Improving the Teaching Effect

In this study, the microlectures were used as the teaching resources for the experimental teaching.

Table 3: Student self-evaluation of mastery degree.

	Control class			Observation class			Value of P
	Proficient	Unskillful	Incapable	Proficient	Unskillful	Incapable	
Preparatory work	34	10	0	34	6	0	0.416
Installing wax blocks	35	9	0	37	3	0	0.122
Moving tool holders	25	19	0	28	12	0	0.260
Adjusting wax blocks	21	23	0	14	26	0	0.169
Cutting wax blocks	9	33	2	6	34	0	0.297
Serial section	5	35	4	16	24	0	0.03*

The results showed that the passing rate of the observation class with blended teaching model was 100%, while that of the control class with traditional teaching model was 82.2%. The score of the observation class in terms of works was significantly higher than that of the control class ($P < 0.05$).

Due to the limitation of objective conditions, experimental teaching can not be taught one to one. 10-20 students are onlookers when the teacher teaches, and the details of the operation are not clear. Moreover, due to time constraints, teachers can only teach once and cannot meet the needs of students for repeated viewing. There are limited opportunities for students to practice in class, and there is no effective guidance after class. All these factors have restricted students' mastery of technology. There are some drawbacks in the separate teaching of theory and practice. The abstract language description of experimental operation in theory class makes students feel boring and difficult to understand. During the operation training of the experimental class, some of the theoretical knowledge learned before has been forgotten. Students feel that the operation of practice lacks theoretical guidance.

The key part of the experimental operation is made into a microlecture video, which is uploaded to the online teaching platform. Students use mobile devices such as mobile phones and tablet computers to prepare for class. If they encounter problems in class, they can also watch online repeatedly, thus solving the above problems (Peiqin Li, Shaofen Yang, Chunhui Zhou, 2016). On the network teaching platform, students can selectively play the microlecture video according to their own needs, which has played a good demonstration and auxiliary teaching role in the study of experimental operation technology (Dewei Li, Hongmei Sun, Enfa Ren, 2013).

3.2 Improving Students' Professional Quality

Experimental teaching of clinicopathological examination technology is a learning way of simulation medicine. Because the specimens faced by the students are simulation specimens and do not have the true background of the patients, the lack of real feelings of the students in the real work situation is not conducive to the cultivation of students' professional emotions and attitudes. Comparatively speaking, the microlecture video creates a working situation in an animated way, and introduces specific cases, which is conducive to the cultivation of students' rigorous and serious professional quality.

3.3 Training Students' Self-Learning Ability

Professional sustainability requires students to have lifelong self-learning ability. The short and precise form of microlectures, rich and diverse content, and timely and efficient information transmission channels of the blue Moyun class platform provide conditions for the development of the blended teaching model, and provide a good resource and environment for the improvement of students' independent learning ability. Before the class, the students can plan the learning time and progress according to their individual abilities, and complete the online learning task. Due to sufficient pre-class learning, students can give full play to their learning initiative in class, carry out positive feedback and discussion, participate in classroom interaction between teachers and students,

and consolidate and deepen the knowledge and skills learned. After the class, the operation exercises under the guidance of the microlecture video further provide students with a way to learn independently. The blended teaching model with microlectures as a resource enhances students' self-learning ability at various stages before, during and after class.

3.4 Improving Students' Interpersonal Communication Skills

With the transformation of modern medical mode, good interpersonal communication ability is one of the core skills of students. However, due to the long-term influence of traditional educational concepts, medical education has been continuing to focus on professional education rather than humanistic education, ignoring the cultivation of students' interpersonal communication ability (Zhou Du, Ping Huang, 2010). The development of a blended teaching model has established a platform for students to enhance mutual understanding and communication. In this study, it was found that microlecture online learning can improve students' interpersonal communication skills. Pre-class online learning allows students to post information and questions in real time through the network, facilitating communication and communication between students or between teachers and students. The interactive links in class also provide students and teachers with the opportunity to communicate face-to-face. Students need to think positively, organize appropriate language carefully, express their views accurately, communicate effectively with their classmates or teachers to get understanding and cooperation. The blended teaching model strengthens students' interpersonal communication ability, and lays a foundation for students to step into clinical laboratory work in the future.

To sum up, the blended teaching model with microlectures as teaching resources makes up for the shortcomings of the traditional teaching model, makes it possible to study individually and autonomously, improves the experimental teaching effect of Clinicopathological Examination Technology, and plays a positive role in improving students' professional quality, interpersonal communication ability and autonomous learning ability.

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