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RESEARCH ARTICLE

THE PRACTICE AND EFFECT ANALYSIS OF MIND MAPPING AND MICRO-CLASS IN BASIC BIOCHEMISTRY EXPERIMENT TEACHING.

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Abstract

Biochemical experiment is an important basic experimental course in life science and related disciplines. Its teaching effect plays an inestimable role in other experiments, undergraduate papers, graduate study and work in the future. In order to improve the students' basic experimental skills and comprehensive ability, this paper carries out the teaching reform of the basic experiment in the biochemistry course, that is, the teaching mode based on the group cooperative autonomous learning, taking the use and making of the micro-class the teaching means. With mind mapping as the main line of teaching, and the goal of students being able to design and complete experiments quickly and efficiently, on the basis of improving students' basic experimental skills, The purpose of this paper is to improve students' autonomous learning ability, teamwork ability, emotional communication ability, educational information technology level, logical thinking ability, theory with practical ability and so on, so as to lay the foundation for the society to transport innovative talents with comprehensive quality.

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Introduction:-

Fund projects: quality course in Biochemistry of Shanxi normal University (2016YZKC-15); Teaching Reform Project of postgraduates in Shanxi Province (2017jg53); quality course of enzyme Engineering in Shanxi normal University (2017YZKC-12); Specialty Project of Biotechnology advantage of Shanxi normal University (2017YSZY-01);

Mind mapping is an effective graphic thinking tool to express divergent thinking by using graphics and text skills to express the relationship between themes at all levels with mutual membership and related hierarchical maps to establish memory links between subject keywords and images, colors, etc.

Micro-class is carried out with video as the main carrier, the theme is carried out around a certain knowledge point or teaching link, intuitive, rich in presentation forms, and convenient learning methods, which is helpful for students to be familiar with the experimental process and the key points for attention in advance ^[2].

Biochemical experiment is an important basic experimental course in life science and related disciplines. Its teaching effect plays an inestimable role in other experiments, undergraduate papers, graduate study and work in the future. However, because the biochemical experiment involves the characteristics of difficult principle, many steps, long time consuming, short class time and so on, in the process of biochemical experiment teaching, the students'

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experimental efficiency is low, and the experimental effect is poor. With the development of life science, In order to improve students' basic experimental skills and comprehensive ability, this paper has carried on the teaching reform to the basic experiment in the biochemistry course. That is, based on the teaching mode of group cooperative autonomous learning, taking the use and making of micro-class as the teaching means, thinking mapping as the main line of teaching, and the goal of students being able to design and complete experiments quickly and efficiently. On the basis of improving students' basic experimental skills, the purpose of this paper is to improve students' autonomous learning ability, teamwork ability, emotional communication ability, educational information technology level, logical thinking ability, theory with practice ability and so on. So as to lay the foundation for the society to transport innovative talents with comprehensive quality.

Teaching goal of basic biochemical experiment.

knowledge objectives.

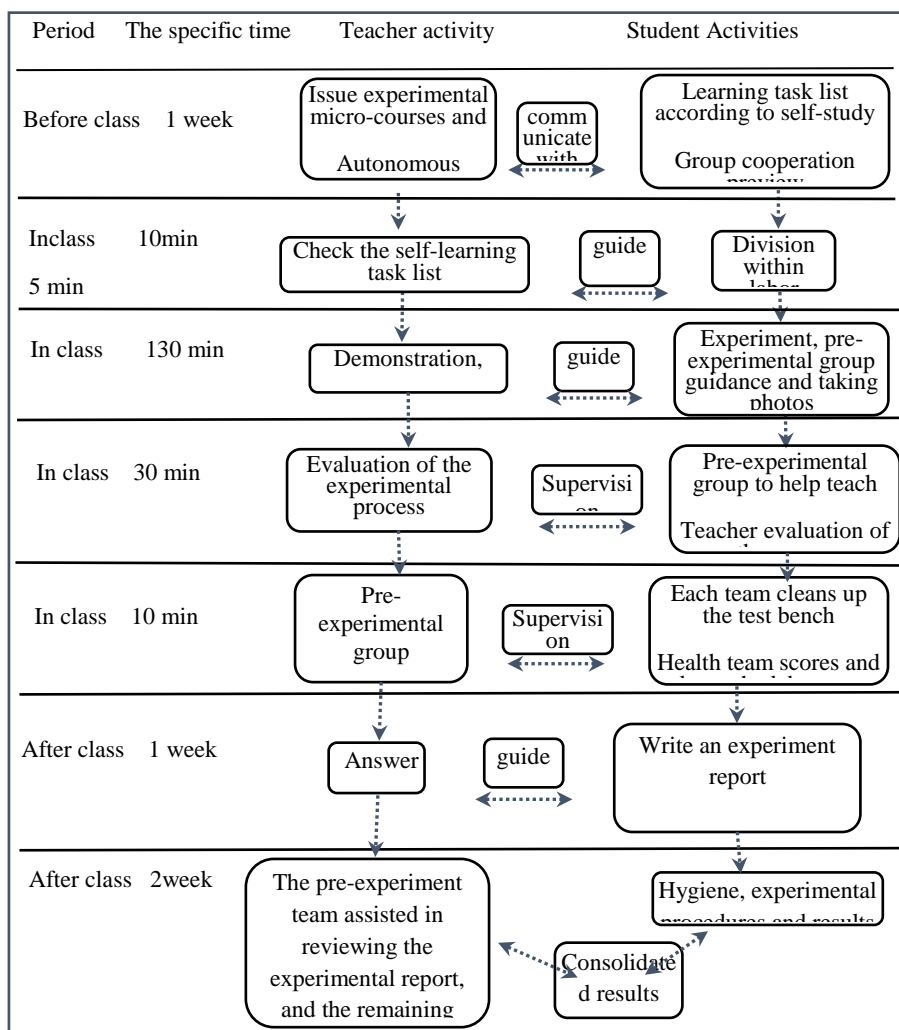
Master the basic principles and skills of biochemical experiments.

capability objectives.

Through the use of mind mapping, improve students' logical scientific research thinking ability and comprehensive ability; through the use and production of micro-class, improve students' basic experimental skills and educational information technology ability, and cultivate students' good experimental habits.

activities and organization of basic biochemical experiment teaching.

The teaching mode of autonomous learning based on group cooperation takes the use and making of micro-class as the teaching means, the mind map as the teaching main line, and the students' ability to design and complete the experiment quickly and efficiently. Design the teaching flow chart of biochemistry experiment course (figure 1), and practice according to this process.



Teaching process.

before class.

taking the micro-class as the preview platform, students write the experimental report in advance in the form of mind map.

One week before the start of the experiment, the teacher transmits the relevant experimental micro-classes and autonomous learning tasks to the campus network platform, After that, the groups have an in-depth discussion on the problems on the preview task list, and communicate with the teachers through the network platform.

Traditional experimental reports can not achieve the expected goal of the experimental report. In this paper, each student is asked to write an experimental report framework in the form of mind map (hand-drawn or drawn with XMind, MindManager and FreeMind software). In addition, students are encouraged to consult data, understand the application of this method in scientific research practice, and guide students to improve the experimental scheme and cultivate students' creative thinking^[4]. under the guidance of micro-class and mind mapping, the teaching assistant carries out the experimental preparation and pre-experiment.

Biochemical experiments generally need to be pretreated. Therefore, the team is required to carry out a pre-experiment to ensure that the reagent is prepared correctly, and to record the matters needing attention in the experiment. At the same time, the teacher guides and corrects the basic experimental operation of the team members in the pre-experiment. Prepare them for the next experimental class as a teaching assistant. in class.

Teachers rely on micro-classes and teaching assistants to standardize students' basic experimental operations.

The basic operation of experiment is the most important link to cultivate students' practical ability and improve their experimental skills. In this regard, the basic operations involved in biochemical experiments and common instruments are made into micro-class videos, which are distributed to students for study at the beginning of the semester. At the same time, the teaching assistant takes pictures or videos of the operation standard experimental action and matters needing attention in order to make the micro-class of the experimental project.

Teachers rely on mind mapping to guide students to think, discuss and cooperate to improve the efficiency of the experiment.

In the course of the experiment, **first of all**, teachers should encourage team members to carry out a reasonable division of labor and even cooperation between groups in the course of the experiment. Secondly, teachers encourage students to actively analyze the causes of errors or matters needing attention, and incorporate this into the writing of the experimental report and the production of the later micro-class, After that, the teacher selects and writes a better framework of the experimental report, and encourage students to improve the experimental methods and cultivate students' innovative consciousness.

Teachers rely on mind Mapping to cultivate students' good Experimental habits.

Good experimental habit is the basic guarantee of laboratory safety, The specific implementation is as follows: each semester, teachers and experimenters make a fixed distribution of the experimental tables and reagent frames, in addition, after the end of the experiment, After the duty students check the hygiene of the experimental tables, the washing of glassware, the return of utensils and the placement of reagents, the members of the group can leave the laboratory and train the students to form good experimental habits and cultivate the students' sense of responsibility, which is of great significance for the students to work in the society in the future.

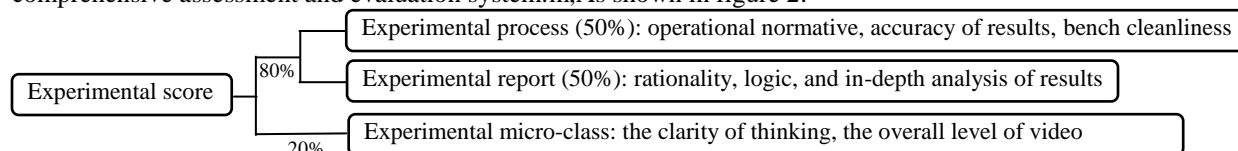
after class.

Each student should perfect the experimental report on the form of mind map written before class, The pre-experimental group is based on the written experimental report as the overall train of thought, with the experimental operation photos and videos collected in the class as the material, the group division of labor to record the micro class. The experimental principle and process are displayed in the form of mind map, and the specific experimental

steps are shown in the form of picture and video as far as possible, and the educational information technology is reflected as far as possible.

4 examination mode.

In order to examine the students' experimental skills in an all-round way, on the basis of "the fixed score of an experimental report", the writing of the thought-guided schema experimental report is used to improve the evaluability of the experimental report, and the making of the micro-class is used to improve the quality of the experimental process. And pay attention to the process evaluation in the classroom, and establish a diversified comprehensive assessment and evaluation system. As shown in figure 2.



5 investigation and analysis of the effect of teaching practice.

In order to understand and further improve the use of mind mapping and microteaching, the practical effects of 2016 and 2017 students participating in teaching reform were investigated. The results are as follows: fig. 2-4.

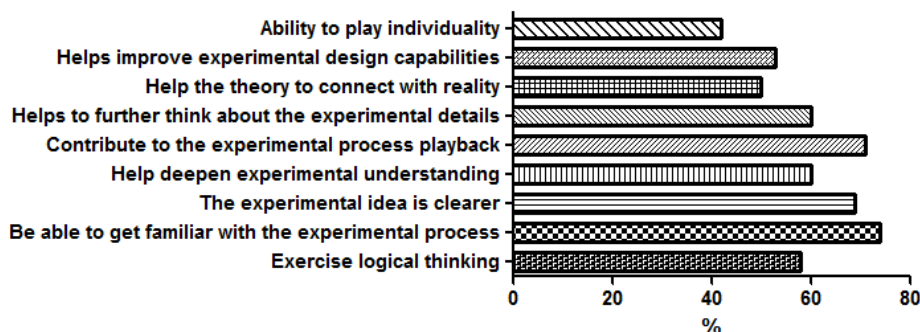


Figure 3:-The practical effect of the mind-guided experimental report in the teaching of biochemical basic experiment

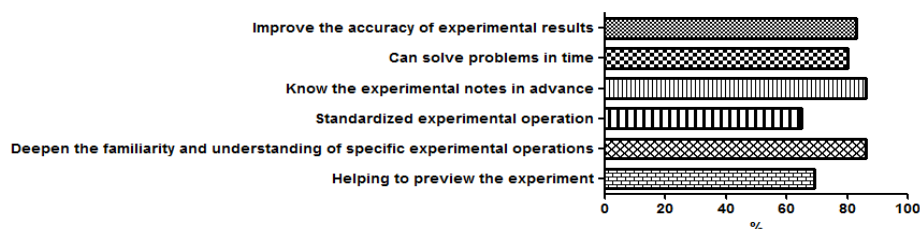


Figure 4:-The practical effect of micro-learning in the teaching of biochemical basic experiment

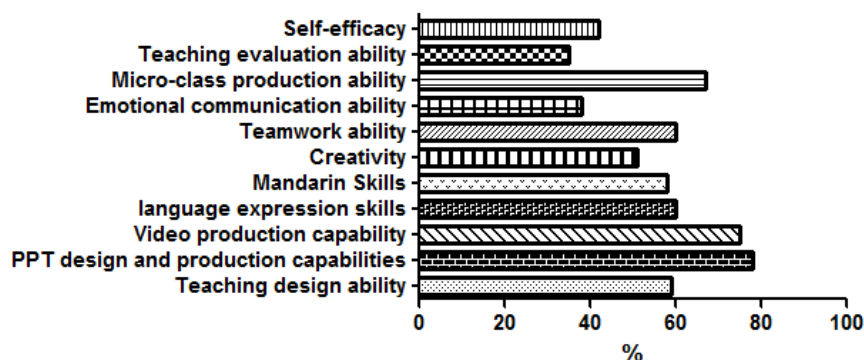


Figure 5:-The production of micro-courses improves students' comprehensive ability

As can be seen from figure 2, more than half of the students generally believe that writing part of the experimental report before the mind mapping class is helpful to exercise logical thinking and familiarize themselves with the experimental process as soon as possible. Thus, it is helpful to perfect the results and analysis of the experimental report after class, which is helpful to the effective playback of the experimental process in the brain. To further improve the ability of combining theory with practice and the ability of experimental design, personalized mind mapping is more conducive to the development of personality, avoids plagiarism, and is more conducive to the differential evaluation of achievements.

As can be seen from figure 3, as a whole, students think that micro-learning is of great help to the study of basic biochemical experiments and improve the accuracy of the experimental results, and solve the questions in the experiment.

As you can see from figure 4, In turn, the students' teaching design ability, video production ability, microcourse production ability, PPT production level, language expression ability, cooperation ability, Putonghua level, innovation ability, self-efficacy and emotional communication. Ability and teaching evaluation ability have been improved to varying degrees.

Teaching reflection.

In this paper, the basic experimental teaching in biochemistry course is reformed, that is, group cooperative learning is the center. The application of mind mapping and microlesson to the whole process of preview and writing experimental report, operation in class, writing experimental report and making microcourse after class has improved the students' basic experimental skills and comprehensive quality in an all-round way ^[3]. However, there are also shortcomings, which need to be deepened and improved in the future, including: The main results are as follows:

1. further strengthen the teaching assistant's teaching assistant ability. teachers should further strengthen the pre-class training of teaching assistants. In addition, for each teaching assistant, a good help group should be assigned in advance to achieve effective and accurate docking.
2. to further improve the students' ability of combining theory with practice. The teachers encourage the students to consult the literature and understand the specific application of the experiment in scientific research and practical application, so as to prepare for the follow-up innovation and the development of the comprehensive experiment.
3. to further standardize the experimental operation habits. Teachers guide students to supervise and correct each other in time while guiding them personally.
4. In addition, with the rapid development of Internet education, teachers should integrate network virtual experiment resources ^[5], carry out virtual operation or video viewing of basic experiments that cannot be set up, and improve students' basic experimental skills as much as possible. To prepare for the development of innovative and comprehensive experiments, and to lay a theoretical foundation for the social transportation of innovative talents with comprehensive quality.

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