Teaching Practice and Exploration of Cloud Class Combined With Mind Map Design in Biochemistry Course in Colleges and Universities of Traditional Chinese Medicine in the Internet Era

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Abstract. Biochemistry is the core course of life science related majors, which expounds the structure, properties, metabolism and function of biological macromolecules. Mastering these basic knowledge is of great significance to students' follow-up learning and development. Based on the investigation method, pithy formula method and lesson study method, this paper explores how to use cloud class and mind map to carry out the teaching of traditional Chinese medicine biochemistry, stimulate students' interest in autonomous learning, help students preview, self-study and review, complete the real-time interactive feedback between teachers and students in the mobile environment, so as to better promote the teaching reform of biochemistry.

Keywords: Cloud Class, Mind Map, Biochemistry, Teaching Design, Teaching Practice

Internet is an advanced technology in the 21st century, which has a profound impact on all sectors of society, especially in the field of education. Under the background of Internet, a series of advanced education platforms and tools such as cloud class and distance education have innovated classroom teaching mode, enriched teaching resources and effectively improved teaching quality and efficiency. Combined with the actual situation, the characteristics of cloud class and its application advantages in biochemistry teaching are briefly analyzed.

1. Analysis of the Characteristics of Cloud Class

In the 21st century, with the rapid development of network information technology, the mode and mode of education and teaching have also undergone earth shaking changes. Multimedia, computer and Internet have entered the field of education, breaking the restrictions of time and space on teaching activities, making online teaching possible. In recent years, with the establishment and
improvement of cloud course teaching platform, as an information-based teaching assistant and digital course resource, it completes the teaching interaction and feedback evaluation between teachers and students in teaching activities. In the application of cloud class in biochemistry teaching, teachers can not only explain the online knowledge points and case demonstration, but also test the students, organize students to brainstorm, conduct online analysis of students' learning situation, organize students to carry out voting and answering activities, and more importantly, promote the sharing of learning resources and let every student as much as possible meet the learning needs. Cloud class also has a strong interactivity, which can provide convenience for the communication and interaction between teachers and students, so as to enable students to solve various problems encountered in the learning process in a timely and effective manner [1].

Biochemistry course has the characteristics of abstract concept, complex knowledge points, dull and complex content, and fast update of knowledge. In the eyes of students, the course has been listed as a difficult problem. In this case, teachers should be able to play the advantages of cloud class, cultivate students' interest and confidence in learning, and let students gradually learn biochemistry with correct attitude and psychology. In order to stimulate students' interest in learning, it is necessary to change the impression of Biochemistry left to students, which is to make biochemistry lively and approachable. Therefore, in cloud class, teachers can understand the learning situation through questionnaire survey, start with students' interests and hobbies, find materials from real life, improve learning resources, push forward frontier information, and let students have a strong interest in biochemistry. In teaching, teachers can guide students to associate and try to explain some life phenomena that they could not understand before based on book knowledge. For example, why drink milk after food poisoning, why some people lose weight excessively, why can appear acidosis and breath out rotten apple smell and so on. Through the advantages of cloud class platform, vivid use of animation, video and other teaching resources to achieve learning guidance, resource sharing, mutual teaching and learning, effectively stimulate students' interest in learning, and make students better understand and remember [2].

2. Analysis of the Value of Mind Map
Mind mapping, also known as mind map or brain map, is a teaching tool that uses visual graphics to organize and express divergent thinking. Mind map is mainly made by teachers' lesson preparation software, supplemented by students' classroom manual production experience. Through mind map, the chapters and knowledge points of biochemistry are connected with logical relationship to improve students' ability of understanding, digestion and memorization. There are more contents in each chapter of Biochemistry, especially the metabolism of the three nutrients. For example, there are complex links between several metabolic processes in sugar metabolism, and there are overlapping or reverse processes among them. It is difficult for students to grasp the knowledge points of this chapter as a whole. Using mind map teaching method can better overcome this difficulty, let students form a whole concept, deepen the understanding, memory and grasp of the key metabolic process. The teacher makes a mind map of the whole teaching content of sugar metabolism in advance, accurately draws the theme, reasonably adds branches, selects and uses key words, effectively identifies the overlapping or reverse process between different metabolism, highlights the key points of adding relevant knowledge, so as to form a complete and rigorous knowledge structure in the students' mind, so as to achieve a thorough understanding [3].

3. Teaching Practice and Exploration of Cloud Class Combined with Mind Map Design in Biochemistry Course

3.1. Application Ideas
Biochemistry is a course with strong theory, many knowledge points, some contents are abstract and complex, and the relationship between units, modules, knowledge points and knowledge points is complex and deep. If the traditional cramming and indoctrination teaching methods are adopted in the
teaching process, it will bring difficulties to students' understanding and memory. In teaching, teachers should focus on inspiring students' thinking, let students find a clue or "fulcrum", and then deepen and expand step by step, and finally integrate all knowledge points [4]. Mind map is just a scientific and effective thinking tool. The reasonable introduction of mind map in cloud class can not only reduce the difficulty of students' understanding and learning, but also stimulate students' interest and gradually find the fun of learning this course. And because mind map has the characteristics of divergence and openness, teachers can add materials to the map at any time according to the actual situation in the teaching process, constantly update and improve the content of the map, so that the classroom teaching content is more rich and comprehensive. In the cloud class, teachers use mind manager and other professional software to draw or guide students to draw mind maps. Under the guidance of mind map, students can deeply explore the knowledge-based system, constantly expand and construct the knowledge structure, analyze and clarify the relationship between knowledge layer by layer, and form clear and correct learning and problem-solving ideas [5].

In the process of making mind map, we can first select a central word or key problem, draw multiple curves radially around it as the first level branch most directly related to the central theme, and then take the subject words of the branch as the center to expand and diverge around, leading to more subordinate branches, until finally drawing a network like mind map, which contains It can help students understand and master knowledge accurately [6].

3.2. Application Cases
The implementation process is mainly divided into three stages: before class, during class and after class, in order to achieve the effect of "teaching internalization re internalization".

Before class, teachers can release preview tasks on the light live broadcast of cloud class activities, and use mind map to stimulate students' interest in learning, reduce students' understanding and learning difficulty, and guide students to learn this knowledge point more easily and efficiently (Figure 1). In the cloud class, mind map is used to show the knowledge points of lipid metabolism. Students are required to find information offline to improve mind map, and answer the concept, classification, distribution and physiological function of lipids in light live broadcast, and give some experience value to excellent students. In this teaching process, not only can students' interest in learning be aroused, but also their divergent thinking can be cultivated [7].

![Figure 1. Lipid Chemistry](image)

During the teaching of this course, the specific teaching objectives are determined according to the syllabus, classroom teaching content and students' ability level. With the help of cloud class, students are guided to learn theories and concepts by mind map method, so that students can clarify the relationship between various knowledge, and let students complete a thought guidance according to their own understanding (Figure 2). In this lesson, students should master the decomposition and metabolism process of fat (triglyceride) with the help of mind mapping tools, and master the skills and methods to solve practical energy calculation problems. Under the guidance of teachers, students should be further familiar with mind map, be proficient in the use of mind map, understand the teaching content, analyze the logical relationship and analyze and summarize the classroom content with the help of mind map tool. After the completion of this lesson, students should be able to review the classroom knowledge and establish the relationship between knowledge with the help of keywords and pictures in mind map. At the same time, through the teaching requirements of this class, students
can further deepen their understanding of the course of Biochemistry, so that students can feel the charm of Biochemistry and have a strong interest in learning [8].

**Figure 2. Fat**

After determining the teaching main line, the specific teaching content and teaching steps are subdivided into the following teaching steps. The first step is to explain the hydrolysis of triglyceride (fat) for students with the help of mobile phones, and guide students to determine the central word and construct the basic mind map framework. Triglyceride will be the final molecule of triglyceride, and then the next step will be explained. The second part guides students to understand the metabolic process of glycerin, and guides them to further expand their thinking links with the knowledge points related to the knowledge, and improve the mind map (Figure 3).

**Figure 3. Catabolism of triglyceride**

In the last teaching stage, the oxidation of fatty acids is mainly explained for students, and the four oxidation steps of fatty acids can be accurately grasped by the explanation [9]. After completing the explanation at this stage, the main line and main frame of mind map will be constructed (Figure 4), and the rhyme will be arranged to guide students to sum up: for example, β - oxidation is the key point, the oxidation object is acyl, dehydrogenation and then dehydrogenation, sulfur decomposition cuts off two carbon, the product acetyl CoA, and finally enters into tricarboxylic acid. On this basis, through the platform of cloud class and the resource database established before, further improve the teaching content, supplement mind map (add teachers' audio and video), expand students' knowledge horizon and guide students' divergent thinking development. In the process of explanation, the teaching content is divided or integrated according to the logical relationship between the knowledge points. At the same time, students are guided to make a thinking map with rich content, complete structure and strict logic according to the main line of the classroom.
After class, students can use the learning materials in the cloud class platform and offline teachers' classroom teaching, and then fill in key words and material files in the mind map according to a certain level. In order to make the mind map more visualized and specific, and give people a better viewing and using experience, in this process, some clip graphs, audio, and other related topic nodes can be added in the process. Video makes mind map easier to learn and use. Confucius said that reviewing the past and learning the new, using mind map review is an indispensable link in learning. Only through timely and scientific review, can the classroom learning effect be consolidated and the comprehensive learning ability be improved [10].

To sum up, teachers can create classes by using cloud class platform, providing students with teaching resources, class sign in, voting questionnaire, discussion and answer, brainstorming, testing, homework tasks, etc. at the same time, according to the participation performance of students in each activity, give certain experience value, and take into account the teaching process and results, so as to build a hybrid teaching mode combining traditional classroom "mobile classroom", guide students to use mind map to make students more familiar with the relationship between knowledge, meet the needs of teachers and students after class, and build a complete knowledge system [11].

3.3. Teaching Effect
Research and practice have proved that the teaching mode of "cloud class + mind map" is very suitable for the teaching of biochemistry. This new teaching mode not only breaks the limitation of time and space on teaching activities, but also greatly improves the convenience and flexibility of teaching work, stimulates students' interest and exercises their ability. After the combination of brainstorming ability and mind map in cloud class, students' professional thinking, learning ability and core quality will be systematically and standardized, and students' ability and quality in all aspects will be significantly improved. In the application of cloud class teaching form, teachers apply mind map to teaching preparation, new lesson introduction, explanation of key and difficult knowledge, organic review after class and other stages. Using mind map to effectively control the teaching, timely adjust the teaching rhythm and constantly supplement and improve the teaching content according to the actual situation, so as to make the classroom teaching more scientific and efficient. At the same time, for students, under the guidance and help of mind map, they will have a more accurate grasp of the classroom learning objectives, learning content, learning requirements, and classroom key and difficult points. With the progress of teaching, students' learning ideas will be clearer, their knowledge system in their minds will be more perfect, their interest in learning will be stronger, and their learning efficiency will be higher [12].

Epilogue
In the Internet era, advanced technologies such as multimedia and computer have brought convenience to the teaching of biochemistry in Colleges and universities of traditional Chinese medicine. The practice and application of the combination of mind map design and information-based teaching assistant cloud class in biochemistry course teaching can further stimulate students' learning enthusiasm, strengthen students' dominant position in learning, improve students' ability to memorize, cultivate students' open thinking and innovation ability to discover and solve problems, and at the
same time, it can provide students with self-study, communication and cooperation between teachers and students To build a platform for communication.

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